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The Far Eastern Review

ENGINEERING FINANCE COMMERCE

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A Chemical Study of Chinese Portland Cement and Local Raw Materials

A Thesis Presented to the Faculty of Soochow University in Partial Fulfilment of the Requirements for the Degree of Master of Arts, by C. H. Zee, B.S.

CONSIDERABLE attention is being paid at the present moment in China to the development of a Portland cement industry, and the following paper by a Chinese engineer student who has carried out extensive analytical work should be of value and interest, not only to the promoters of new enterprises but to the foreign manufacturer of cement machinery.

1.—The Aim of this Study

The aim of this study is to determine by exact chemical analysis the percentage compositions of the various samples of Portland cements manufactured in China, to compare the results thus obtained with the usual standard compositions of American Portland cement ; to determine the percentage compositions of samples of raw materials found locally ; and to consider whether or not the raw materials analyzed may be used for the manufacture of Portland cement. In this paper are set forth clearly though briefly the processes used in the analysis, the results obtained and the conclusions derived from this study. A historical sketch of the Portland cement industry and a brief description of the methods of manufacture are also included.

2.—Historical Introduction

Portland cement is an artificial chemical product of fairly definite composition. It contains approximately 60 to 65 per cent. of lime, 19 to 25 per cent. of silica, 5 to 12 per cent. of iron oxide and alumina. The percentage of each of these four constituents may vary, but only within a narrow range. Hence Portland cement is a definite product, capable of being expressed very closely by an empirical formulæ.* This is one of the few points which distinguish Portland cement from the various brands of natural cements which were exclusively used before its invention.

Although the Portland cement industry has attained great importance now, it is less than a century old, quite young as compared with the steel and iron industry, for example. It was in the year 1824 that Joseph Aspdin of Leeds, England, received a patent for a cement product of his own invention, which he named "Portland cement," because of its resemblance to the colitic limestone of Portland, a very well-known English building stone at that time. Although Aspdin was almost immediately engaged in the commercial manufacture of his new cement, using his wet-mixing and grinding method to be described later, yet for more than twenty years the growth of the Portland cement industry was exceedingly slow, notwithstanding the fact that the people of the continent took up the industry with great eagerness. One reason for its slowness in growth is to be found in the high price of the new product as compared with the natural cements previously used. About 1850, however, a distinct increase in the use and production of the Portland cement, both in England and on the continent became noticeable. From this time on the Portland cement industry met with every success. It not only displaced natural cements of the older type rapidly from all European markets, but also because an important article of exportation to both Asia and America.

In the United States of America, the first attempt at Portland cement manufacture was evidently made in 1872, when an experimental plant was constructed at Kalamazoo, Michigan. Within the next ten or fifteen years, many plants were established in different localities ; and the introduction of the improved methods of ignition and grinding finally revolutionalized the Portland cement industry. This has intimate connection with the method of manufacture, and is to be further described in that section. The marvelous development of the Portland cement industry in the United States may be shown by comparing the total annual production of 42,000 barrels in 1880 with 88,230,170 barrels in 1914. The price per barrel fell correspondingly from $3.00 in 1880 to $1.09 in 1910 and $0.927 in 1914.

Here in the Orient, Japan seems to be leading in the cement industry. There are sixteen companies in Japan and twenty factories. Exports have gone up steadily from 67,651 barrels worth $163,500 in 1911 to 668,613 barrels worth $1,229,000 in 1916.

In China, the factory at Tangshan, Tientsin, known as "Chee Sing Cement Company" is doing a good business. Their product is said to have been repeatedly tested according to the British methods by specialists from Great Britain, Germany and Japan. With respect to fineness, setting time, tensile strength and soundness, they have found it to be comparable with the best product of foreign countries. In the industrial exhibition held at Nanking in the fall of 1910, the Chee Hsing brand of cement obtained first honors. It has been extensively used in the construction of railways. The steel bridge across the Yellow River in the Pukow-Tientsin Railway was built with the aid of this cement. And it was considered by the engineers to be perfectly satisfactory, showing no sign of yielding under three thousand blows by a machine weighing four and a half tons.

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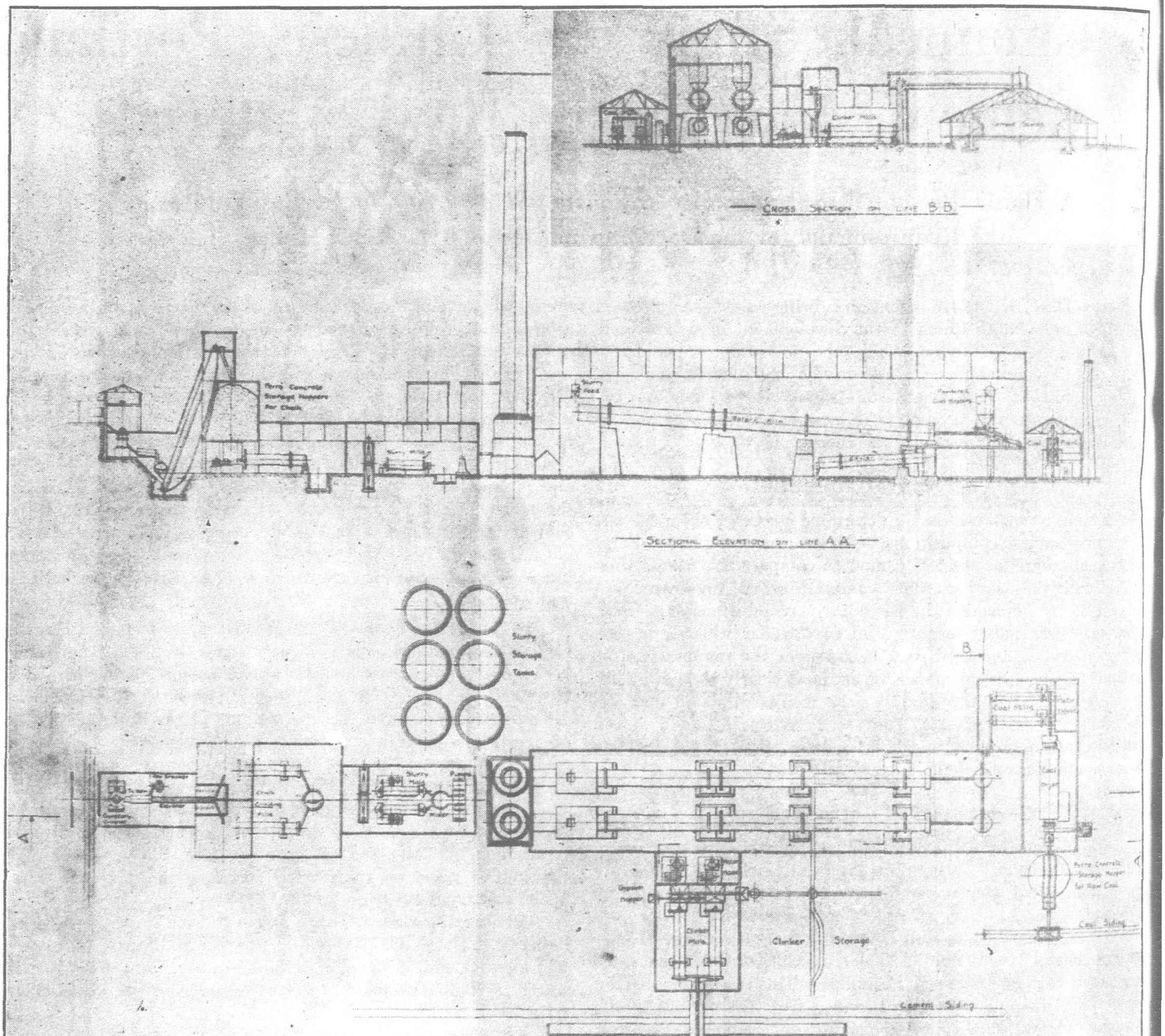
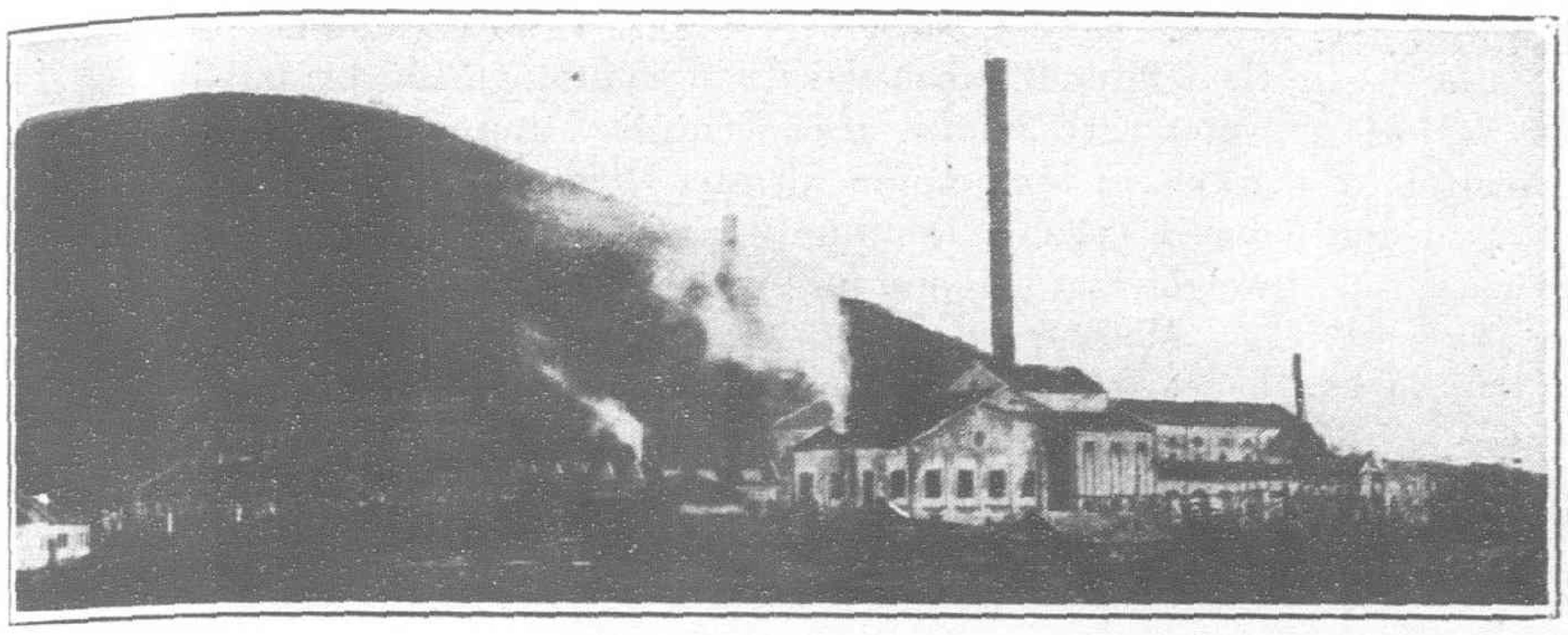
* Three different formulæ proposed by various authorities, are given in Thorp's "Outlines of Industrial Chemistry," page 170.

The "Chee Hsing" factory, however, is probably not the one first established in China. The cement factory at Hankow, Hupeh, was established first, and has been known to the industrial world here for many years. This factory also received honors at the Nanking industrial exhibition of 1910. A cement-made coffin and cement-made railroad cross ties were put up by this company, and they received much praise. But recently it has been reported that this company has stopped business.

Another factory for cement manufacture is located at Hongkong, established by the joint capital of Chinese and foreigners. The raw materials are obtained from Tsingchow, a district of Kwangtung province, hence this kind of cement is known as "Tsingchow cement." It is sold at Shanghai at 4.2 taels per barrel of 375 pounds. It is claimed to be the best cement in the Asiatic market in quality and in strength. It is extensively used by the British and American governments for building purposes in Hongkong, Singapore, the Malay States and the Philippine Islands. There is a fourth factory at Tsingtau, but since the Japanese occupation, nothing has been heard of it.



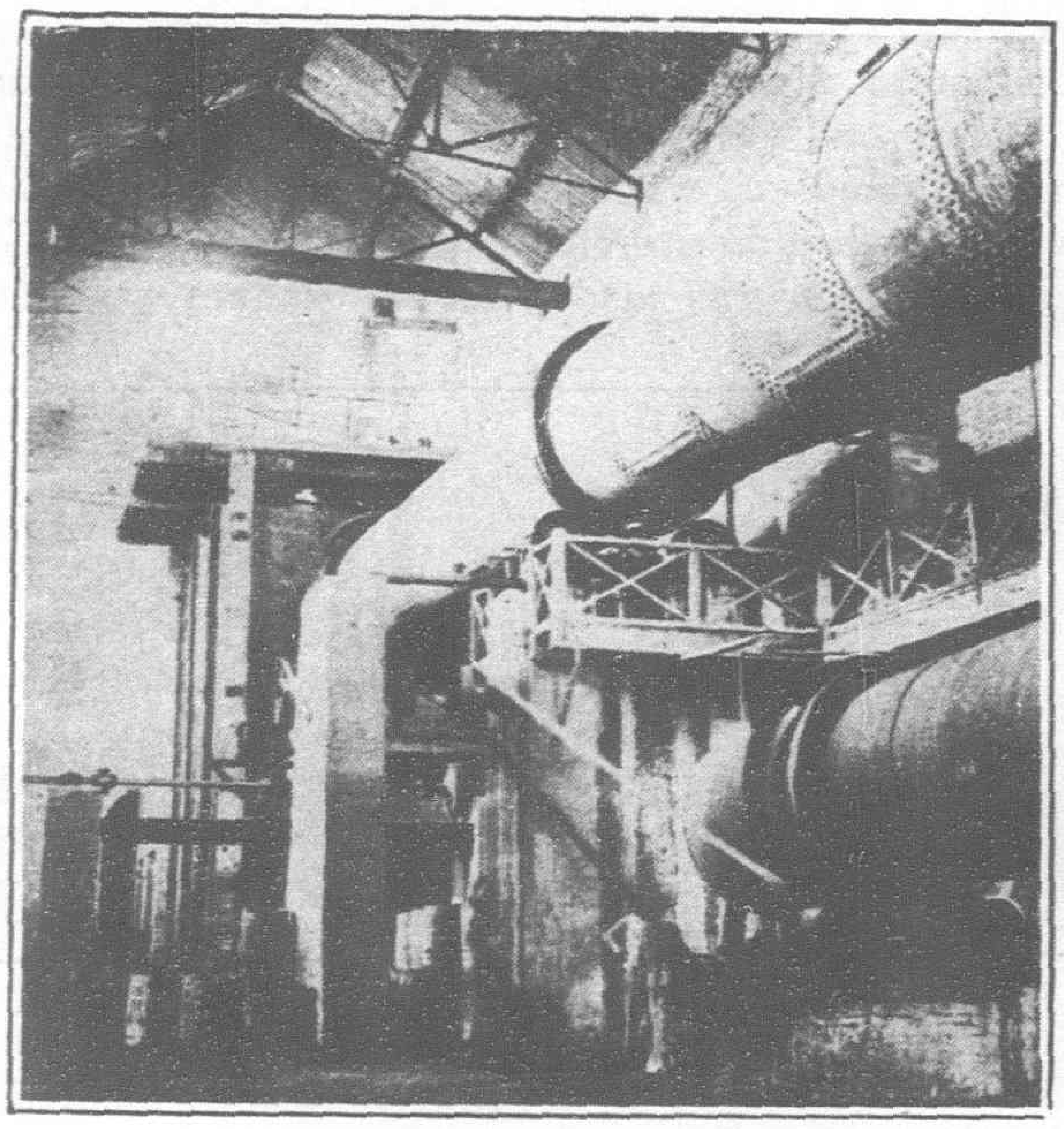
General Arrangement of an Edgar Allen Wet Process Plant



Hupeh Cement Works

3.—Methods of Manufacture

The essential feature of cement manufacture is the formation of a fairly definite chemical product from a mixture of altogether unlike substances under the action of intense heat. That this may be properly performed, and that the resultant product may be in such shape as to be ready for use, three stages of manufacture are necessary, whatever the details of the processes may be. First, raw materials of proper chemical and physical composition must be thoroughly mixed in proper proportions, drying and grinding to a very fine powder being sometimes necessary to secure this intimacy of mixture. Then the mixture thus obtained must be burned at this very high temperature until the constituents unite physically and chemically as a clinker mass, and lastly this clinker mass must be finely ground again. The product of these processes is the Portland cement of commerce.

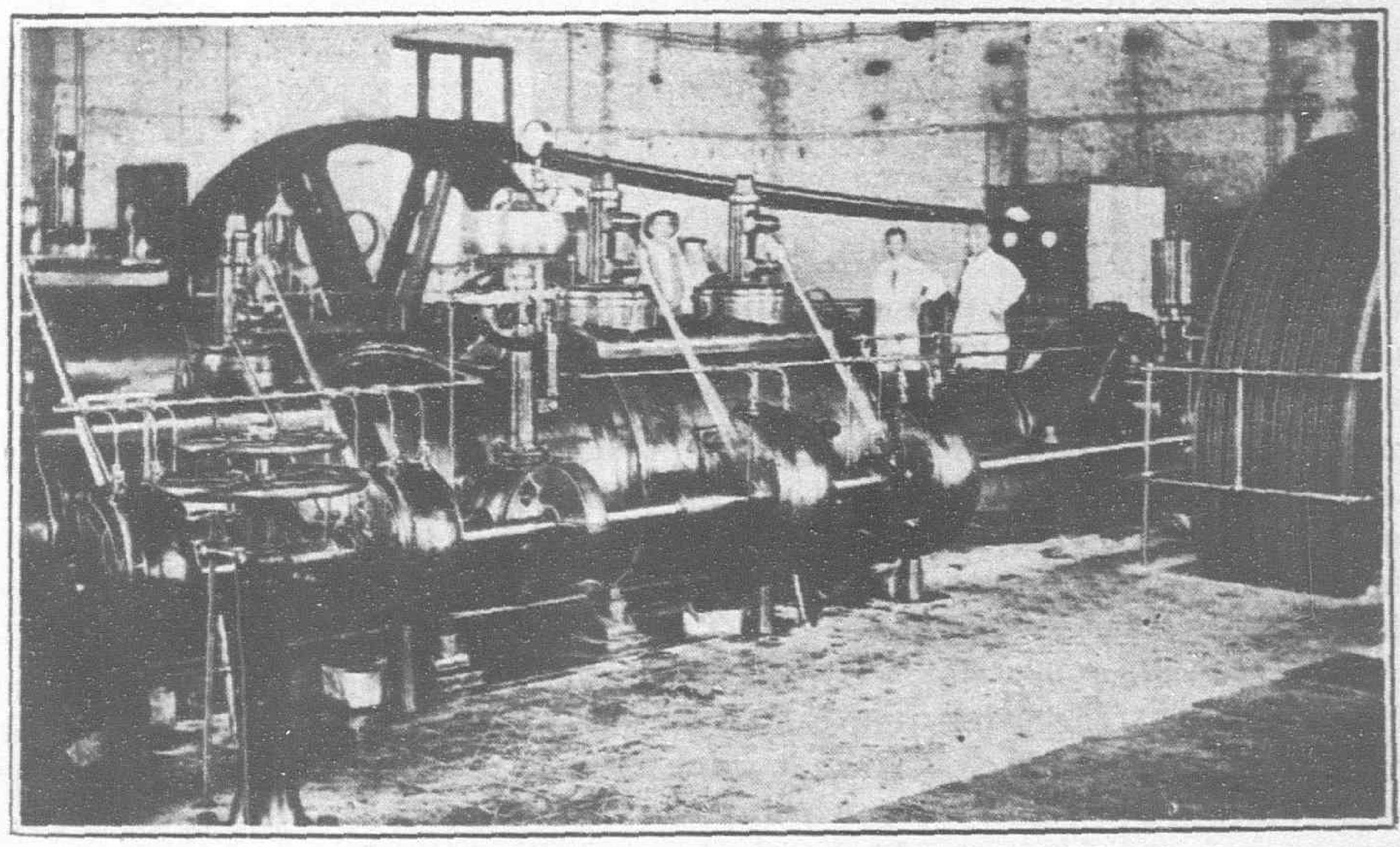


Tube Mills, Hupeh Cement Works

The method used by Aspdin, the inventor of Portland cement, and the earlier European manufacturers is known as the "wet-mixing and grinding method." The raw materials were mixed and ground in a wet condition, and burned in stationary vertical kilns, the resulting clinker was then ground by millstones. But recently the dry process has been generally preferred, as it is simpler and cheaper. Also, in the modern factory, the stationary kiln and the millstones have been replaced, respectively, by the rotary kiln and modern grinding machinery. Both these improvements were made through the inventive genius of American engineers.

The rotary kiln consists of a cylinder of steel, frequently 100 to 150 feet in length, and a few larger ones even attain the length of 250 feet. This lengthening of the kiln keeps the raw material in contact with the hot gases for a longer time, and consequently allows it to abstract more heat from them. In its old type, which was much shorter, the rotary kiln was very wasteful of fuel. The rotary kiln is lined with firebricks and set at a slight inclination to the horizontal. It revolves on two or three tires and is turned by a gear and pinion. The mixture of raw materials, either dry as when limestone or cement rock is used, or wet when marl is used, is fed in at the upper end of the kiln by means of a screw conveyer. It travels slowly downward toward the burning coal under the influence of gravity as the kiln is revolved, and during the two or three hours' passage through the furnace it is thoroughly calcined. The fuel, usually in the form of powdered coal, is blown in by an air blast at the lower end of the furnace, which is covered by a movable firebrick hood. In rare cases, oil or producer gas is used. The burned clinker also falls out at this lower end through a hole in the hood into a contrivance which conveys it to an upright cooler for cooling.

As to grinding the raw materials, different methods are used. In case of cement rock and limestone, the materials are ground dry by (1) crushers, (2) rolls, and (3) Griffin mills, or (1) crushers, (2) ball mills, and (3) tube mills. Gyratory crushers are exclusively used for the first stage of grinding. For finer grinding, Griffin's and Huntingdon's mills were at first used; later ball and tube mills came to favor; but at present there seems to be some reaction toward the earlier types. Wet materials—marl and clay—require less grinding than dry materials. The clay is usually broken up in dry pans or edge runner mills, and then together with marl passed through a tube mill before ignition. Gyratory mills are made in many sizes, and require from 1 to 1.2 horse-power per ton of rock crushed per hour, depending on the hardness of the rock. The Griffin mill is a steel roll, revolving on a vertical shaft with a gyratory motion, and pressing by centrifugal force against a steel ring. It has great capacity, and will grind so fine that about 90 per cent. of the product will pass through a 100-mesh sieve. A Griffin mill of ordinary size will turn out from three to five tons of rock per hour, and requires 25 to 28 horse-power to run it. A ball mill will usually grind from 4 to 6 tons of raw material and from 12 to 16 barrels of clinker per hour. In doing this it will consume 30 to 40 horse-power. The tube mill is a horizontal iron tube, about 16 feet long by 4 feet in diameter, rotated some 25 times a minute by gears. It usually requires 75 to 80 horse-power and turns out from 5 to 7 tons of raw materials, or from 12 to 16 barrels of finished cement per hour. For further descriptions of these machines, a text may be consulted.



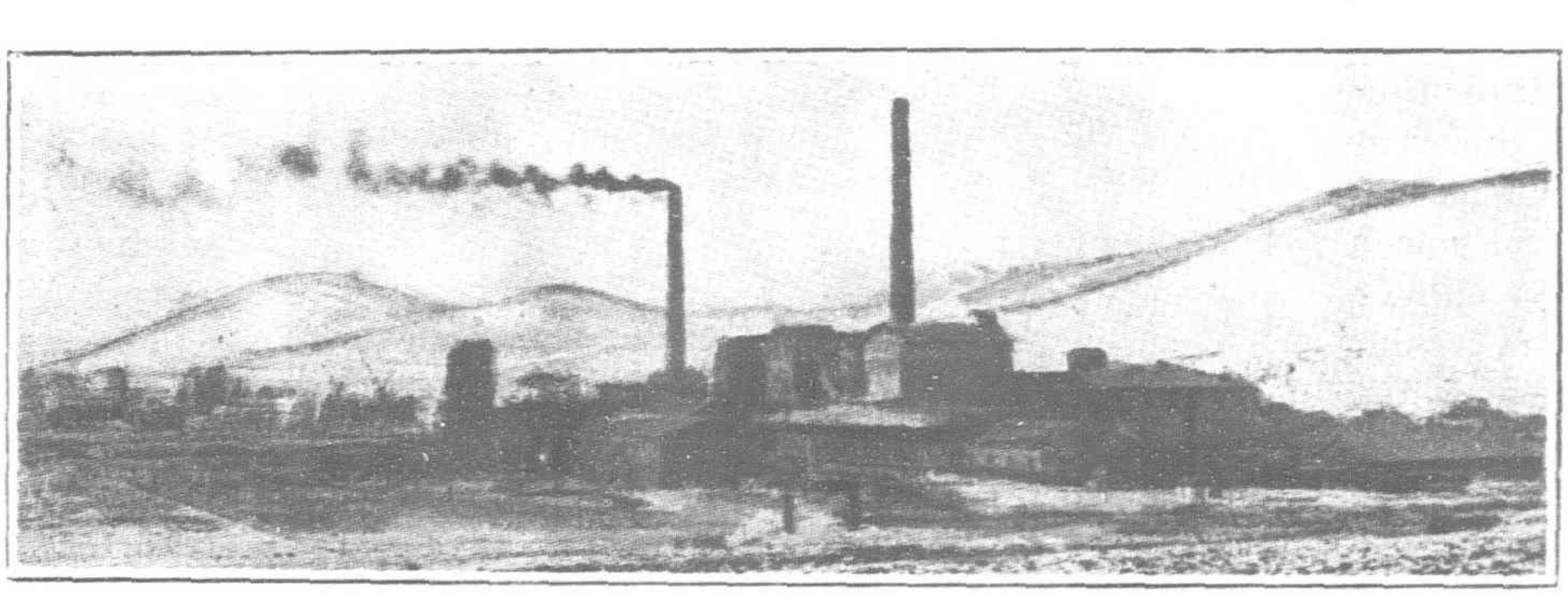
Engine Room, Hupeh Cement Works

4.—Chemical Analysis of Chinese Portland Cements

Three samples of cement were obtained from the factories at Hankow, Tientsin and Hongkong, and a chemical analysis of each sample was made. Below are given the methods used and the results obtained.

1. *Determination of Silica, $Si0_2$.*—The sample was first made to pass through a 100-mesh sieve; thoroughly dried at 100° C. in an air bath; then weighed out from a stoppered weighing bottle in quantities of about 0.5 g. into a porcelain dish. The sample was stirred with 10 cc. of cold water until all lumps were broken and 10 cc. of cold dilute (1 : 1) hydrochloric acid were added. The dish was placed on a water bath and the contents evaporated to dryness, moistened with water and a little hydrochloric acid and evaporated to dryness again. When dry, the dish was put in an air bath and heated for an hour. When cool, the contents of the dish were moistened with 10 cc. of (1 : 1) hydrochloric acid. Twenty cc. of water were then added, and the mixture digested on a wire gauze for 10 minutes. The silica, thus dehydrated, was filtered on a 9-cm. filter, washed ten times with hot water, dried, and ignited to constant weight in a platinum crucible over a blast lamp. It was weighed as silicon dioxide, $Si0_2$.

2. *Determination of Iron Oxide and Alumina, $Fe_20_3 + Al_20_3$.*—The filtrate from silica was brought to a boil, and a slight but distinct excess of ammonium hydroxide was added, and the boiling continued for five minutes more. It was then filtered and washed once with hot water. The precipitate was then washed down from the paper into the beaker in which the precipitation was made by using 20 cc. of 1:5 nitric acid and the solution diluted to 100 cc. Ammonium hydroxide was again added to reprecipitate the iron and aluminium. The precipitate was then collected on the same filter paper as used for the first precipitate, thoroughly washed with water, dried, and ignited to constant weight over a blast lamp. The hydroxide of iron and aluminium were changed to oxides by the intense heat and were weighed as such. The reprecipitation and washing were necessary to remove any calcium or magnesium salts that might be present in the first precipitate.



Onoda Cement Factory, near Dairen

3. *Determination of Calcium Oxide or Lime, $Ca0$.*—The calcium was precipitated as an oxalate from a boiling solution by adding ammonium oxalate in excess to the filtrate from the aluminium and iron determination. The precipitate was allowed to settle for 15 minutes or more, filtered and washed ten times with hot water, using as little water as possible. The paper with the precipitate was then transferred to the beaker in which the precipitation was made, and the paper was spread out against the side of the beaker near the top. The precipitate was washed from the paper and dissolved in 50 cc. of dilute sulfuric acid (1:4). The paper was folded over and allowed to remain against the side of the beaker. The solution was then diluted to about 150 cc., heated to about 80° C., and titrated with a standard solution of potassium permanganate, which had been previously standardized by means of oxalic acid. When a pink color was produced, the filter paper was allowed to drop in; the color was at once discharged. The titration was then finished by adding the reagent very carefully one drop at a time.

4. *Determination of Magnesia, $Mg0$.*—Two methods were tried.

Method A.—The filtrate from calcium oxalate was acidified, and evaporated to about 160 cc. When it was cooled, 15 cc. of a 10 per cent. solution of sodium hydrogen phosphate and 15 cc. of strong ammonium hydroxide were added with thorough stirring. It was left in a cool place over night. The crystalline precipitate was then filtered, washed with a solution made by mixing 800 cc. of water with 300 cc. of concentrated ammonium hydroxide and 100 grams of ammonium nitrate. The precipitate was dried, ignited over a gasoline lamp until a constant weight was reached. It was weighed as magnesium pyrophosphate.

Method B.—Method A did not give satisfactory results, hence in later determinations a different method was used. The acidified filtrate from calcium oxalate was heated to boiling and treated with an excess of ammonium phosphate. A volume of 10 per cent. ammonium hydroxide equal to one-third of the volume of the solution was at once added, the solution was allowed to cool, and was filtered after allowing it to stand over night. The precipitate was washed with 2.5 per cent. ammonia, dried, and ignited very slowly, the heat being gradually increased until the precipitate was white. It was weighed as magnesium pyrophosphate. The ignition must be gradual, or it is almost impossible to obtain perfectly white precipitate.

5. *Determination of Sulfur Trioxide, $S0_3$.*—About a gram of the sample was weighed out, silica was separated and determined as above. The filtrate was then boiled, and 10 cc. of a boiling 10 per cent. solution of barium chloride were added with thorough stirring. After standing over night, the precipitate was filtered, dried and ignited. The precipitate was moistened with a drop or two of concentrated sulfuric acid, evaporated to dryness, and ignited again to constant weight. It was weighed as barium sulfate.

6. *Determination of Iron Oxide, Fe_20_3.*—The filtrate from barium sulfate was acidified with hydrochloric acid and brought to a boil. A solution of stannous chloride in dilute hydrochloric acid was carefully added drop by drop until the last drop made the solution colorless. The liquid was then quickly cooled by cold water, and 15 cc. of a saturated solution of mercuric chloride were at once added, giving a slight, white precipitate. It was then titrated against a standard solution of potassium dichromate, previously standardized with ferrous ammonium sulfate, till a drop of a 1 per cent. potassium ferricyanide solution, tested with a drop of the iron solution, showed no blue color on a white plate. The percentage of iron oxide was then calculated, and the percentage of alumina got by difference.

7. *Determination of Ignition Loss.*—About 0.5 grams of cement was weighed out into a weighed platinum crucible, covered with a lid, and ignited, starting with a low flame, gradually increasing the heat and finally heating it over a blast lamp for fifteen minutes. The lid was taken off with the tongs, washed with water from a wash bottle, and heated again to redness. The crucible with lid was then cooled and weighed. The loss consists mainly of combined water and carbon dioxide, driven off by the heat.

The record of the analysis is given below.

Cement No. 1 (Hankow)

	$Si0_2$	Fe_20_3	Al_20_3	$Ca0$	$Mg0$*	$S0_3$	Ignition loss
1	20.15	4.18	5.40	61.05	1.15	1.66	5.02
2	20.61	4.12	5.22	60.42	1.22	1.75	5.53
3	20.75	4.15	5.22	59.82	1.32	1.86	5.64
4	19.69	4.30	5.43	61.13	1.21	1.75	5.16
5	19.80	4.30	5.23	61.33	1.18	1.67	5.42
6	20.03	4.13	5.34	60.57	1.23	1.82	5.58
Average ...	20.17	4.20	5.31	60.72	1.22	1.75	5.39

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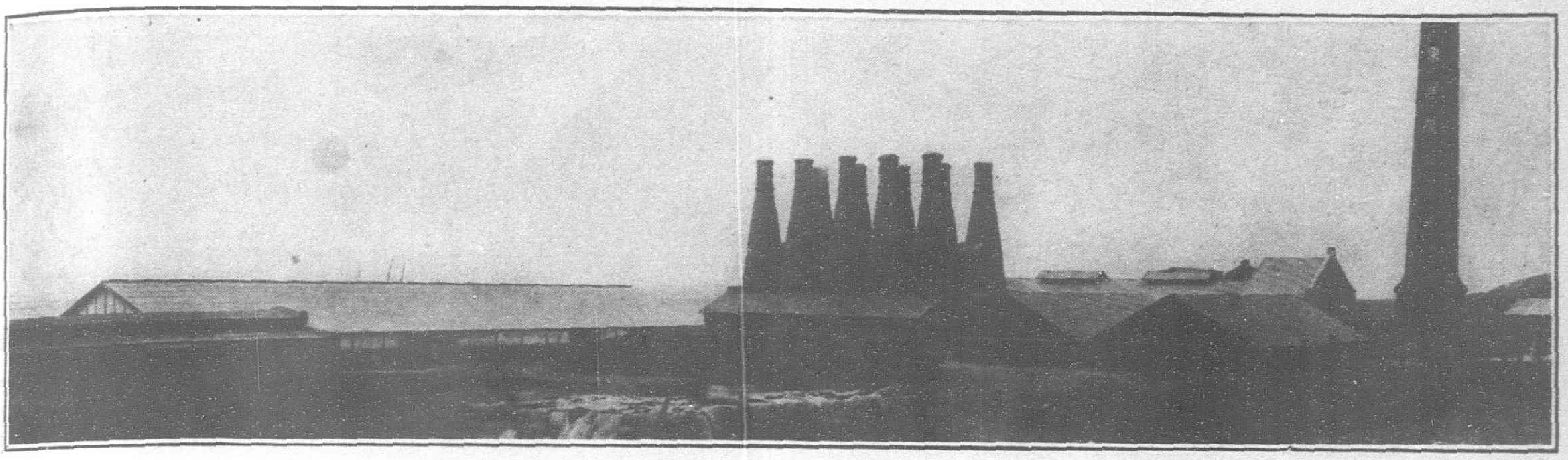
* All the magnesia determinations in No. 1 and the first determination in No. 2 were made by following method:—A. In all other determinations method B was followed.



Plant of the Shantung Cement Works, near Tsingtau

Cement No. 2 (Tientsin)

	$Si0_2$	Fe_20_3	Al_20_3	$Ca0$	$Mg0$	$S0_3$	Ignition loss
1	19.17	4.37	5.71	62.92	1.36	1.52	5.63
2	19.29	4.35	5.76	62.47	1.42	1.55	5.97
3	19.22	4.46	5.86	62.32	1.60	1.54	5.64
4	19.02	4.72	5.55	62.62	1.42	1.55	5.91
5	19.07	4.52	5.23	63.02	1.66	1.55	5.72
6	19.29	4.78	5.07	62.93	1.38	1.55	5.67
Average ...	19.18	4.53	5.53	62.71	1.47	1.54	5.76

Cement No. 3 (Tsingchow)

	$Si0_2$	Fe_20_3	Al_20_3	$Ca0$	$Mg0$	$S0_3$	Ignition loss
1	22.27	2.58	6.94	60.43	1.56	1.25	5.13
2	22.00	2.59	6.94	60.50	1.86	1.24	5.05
3	21.98	2.60	7.12	60.47	1.80	1.21	5.00
4	22.19	2.60	7.19	60.23	1.66	1.25	5.03
5	22.25	2.62	7.18	60.19	1.60	1.25	5.11
6	22.00	2.61	7.19	60.31	—	1.28	5.28
Average ...	22.11	2.60	7.09	60.35	1.70	1.25	5.10

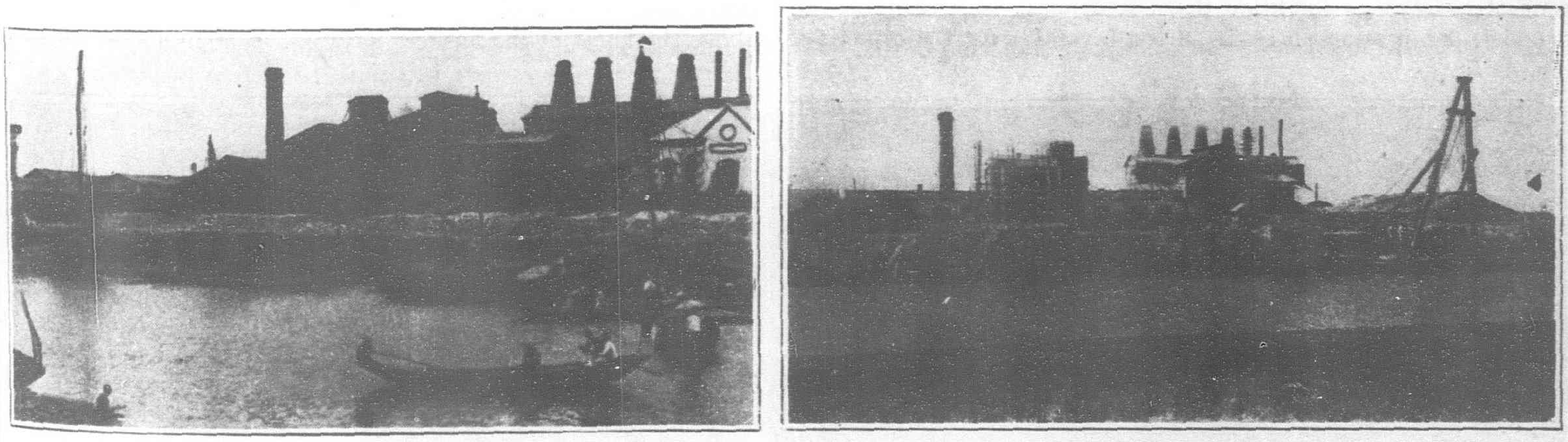
Combining the results into one table, we have

	$Si0_2$	Fe_20_3	Al_20_3	$Ca0$	$Mg0$	$S0_3$	Ingition loss
Cement No. 1...	20.17	4.20	5.31	60.72	1.22	1.75	5.39
Cement No. 2...	19.18	4.53	5.53	62.71	1.47	1.54	5.76
Cement No. 3...	22.11	2.60	7.09	60.35	1.70	1.25	5.10

5.—Comparison of Chinese and American Portland Cements

Below is given the composition of several samples of American Portland cements for comparison:—

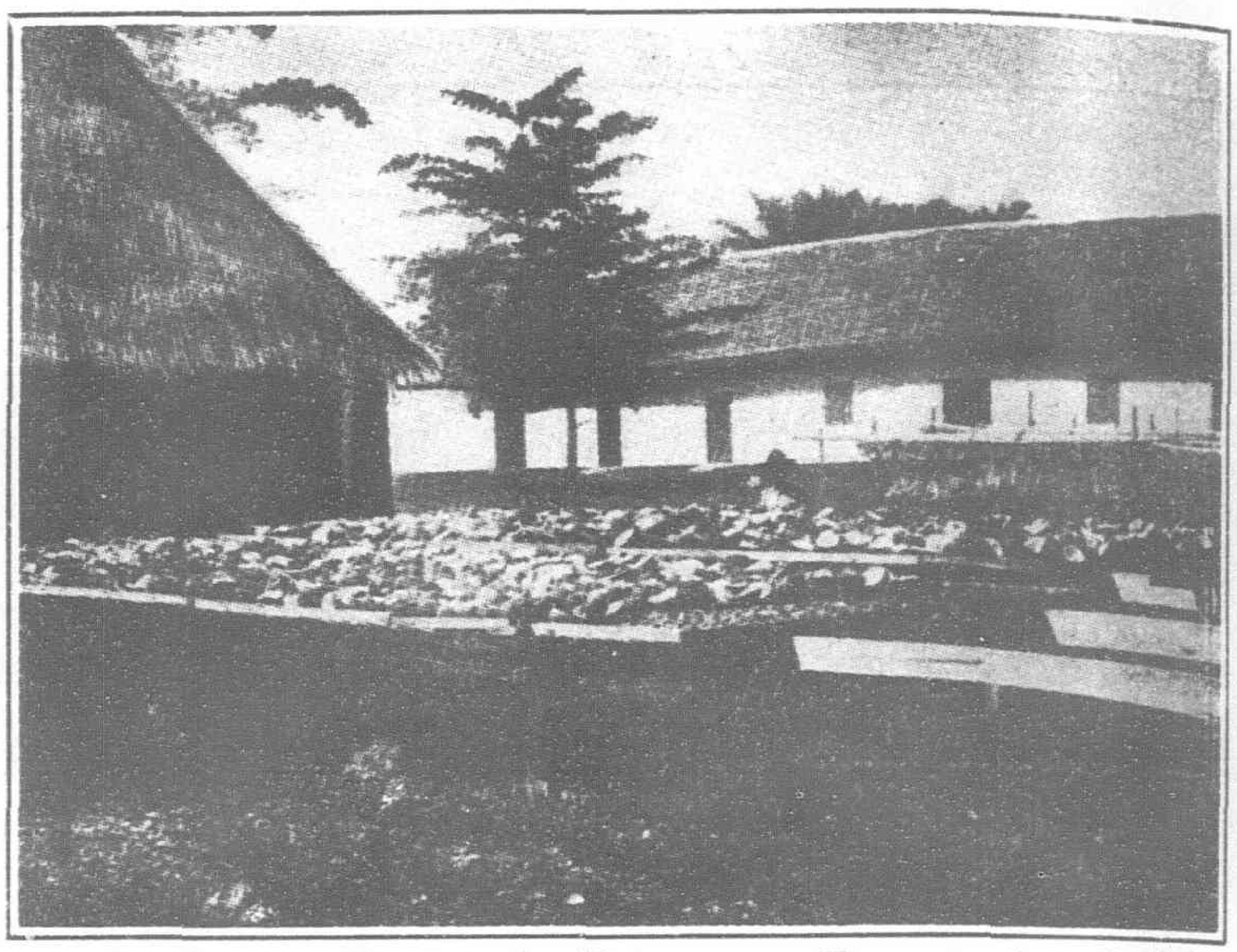
Source	$Si0_2$	Fe_20_3	Al_20_3	$Ca0$	$Mg0$	$S0_3$	Ignition loss
New Jersey ...	21.82	2.51	8.03	62.19	2.71	1.02	1.05
Pennsylvania...	21.94	2.37	6.87	60.25	2.78	1.38	3.55
Ohio	21.86	2.45	5.91	63.09	1.16	1.59	2.98
Michigan ...	22.71	3.54	6.71	62.18	1.12	1.21	1.58
Virginia	21.31	2.81	6.54	63.01	2.71	1.42	2.01
Missouri	23.12	2.49	6.18	63.47	0.88	1.34	1.81
llinois	22.41	2.51	8.12	62.01	1.68	1.40	1.02



Two Views of the Haiphong Cement Works at Haiphong, Indo-China

In a later issue of THE FAR EASTERN REVIEW there will appear another article on Cement, which, unlike the above, will deal more with detailed descriptions of existing cement works in China and the Far East. The subject is made more interesting because of the large uses to which cement is already put to in the Far East; and with the prospective development, on a large scale, of harbors, buildings and other enterprises wherein this very useful product is necessary, it is fitting that the source of supply, the quality of supply and the adequacy of supply all bear inspection.—*Ed.*

The Native Method of Husking Coconuts



Sun Drying, Showing the Nuts on the Trays, ready to be Pushed under the Shelter

Mechanical Copra Drying

COPRA is the dried meat of the coconut, and at present constitutes the principal and the most important article of export derived from the coconut palm. The meat is dried in the sun or in artificial driers, among which may be classed the so-called "tapahan" driers, in which most of the Philippine copra is prepared.

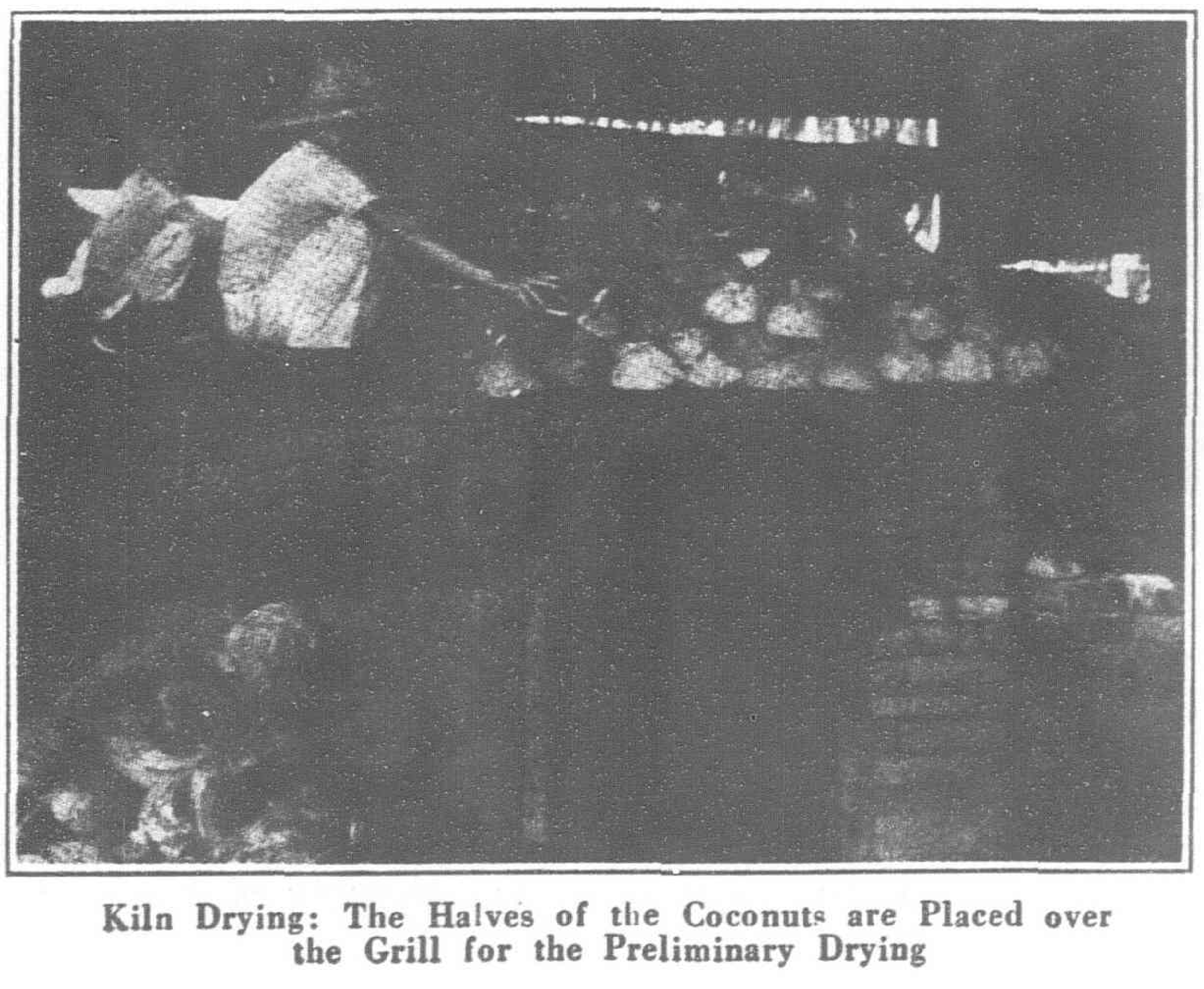
The bureau of science, Manila, has experimented with a method for the preparation of copra by treatment of sulphur dioxide gas, and allowing the meat to dry without addition of artificial heat.

In order to successfully resist deterioration from molds and bacteria and so produce a first-grade oil and secure the highest price obtainable in the market, copra should be made only of fully matured or "cured" nuts; it should be thoroughly dried so as to make a clean product, containing not more than 6 per cent. of water. Ordinary sun-dried copra contains about 9 per cent. and "tapahan," or smoke-dried copra, frequently exceeding 20 per cent. of moisture, a condition that, particularly in long storage in a moist, damp atmosphere, is all too favorable for the growth of molds, the foremost enemy of improperly prepared and improperly cared for copra, and the formation of fatty acids at the expense of the oil content. Where climatic conditions permit, sun drying may be resorted to; in other regions artificial driers must be used.

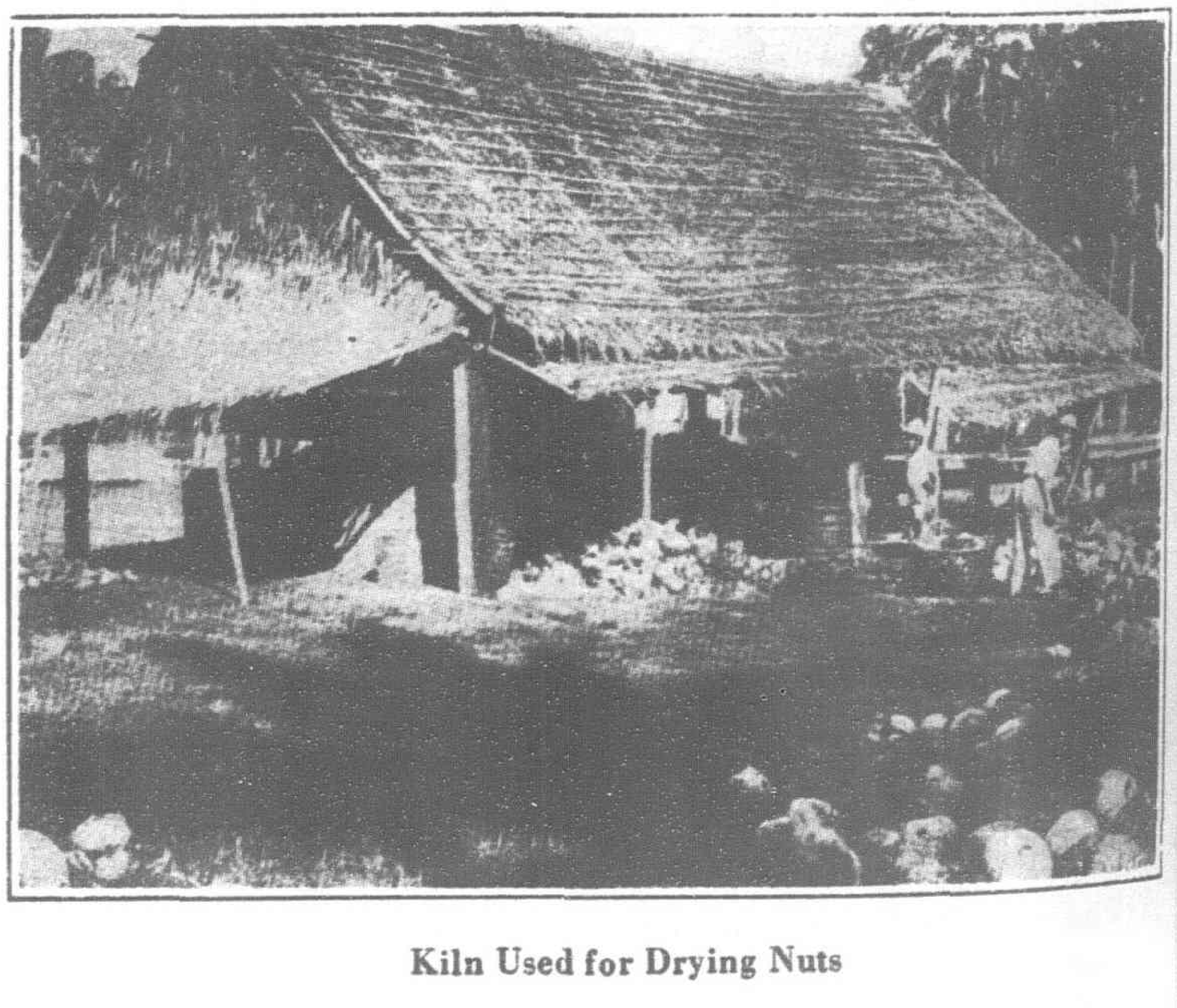
After the nuts are properly cured they are ready for husking, the first operation in copra making.

Many attempts have been made to invent a mechanical husker, and several power-driven huskers have been devised and placed upon the market. Whatever the reason, such as have been introduced into the Philippines do not seem to have proved satisfactory and none are in operation. All the husking in the Philippines is done by hand. Considering that an experienced husker can handle 1,000 or more nuts per day, at the present price of labor it seems unlikely that power huskers will supersede manual labor for this process for some time to come.

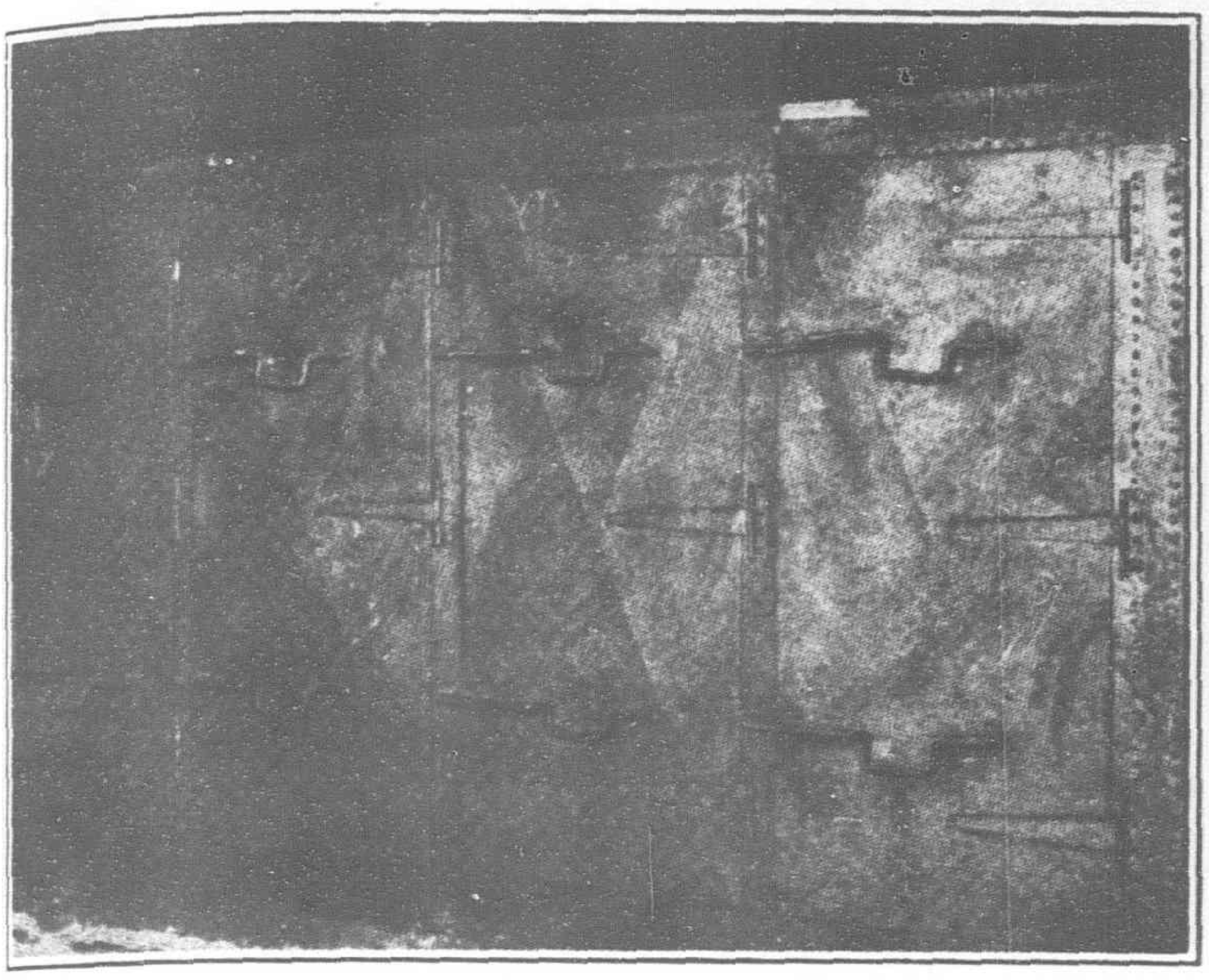
The husking by hand is a very simple operation and consists of the use of an ordinary sharp plow-point pointing upward, set into a heavy block of wood, and so high that the point is a little above the knees of the husker.



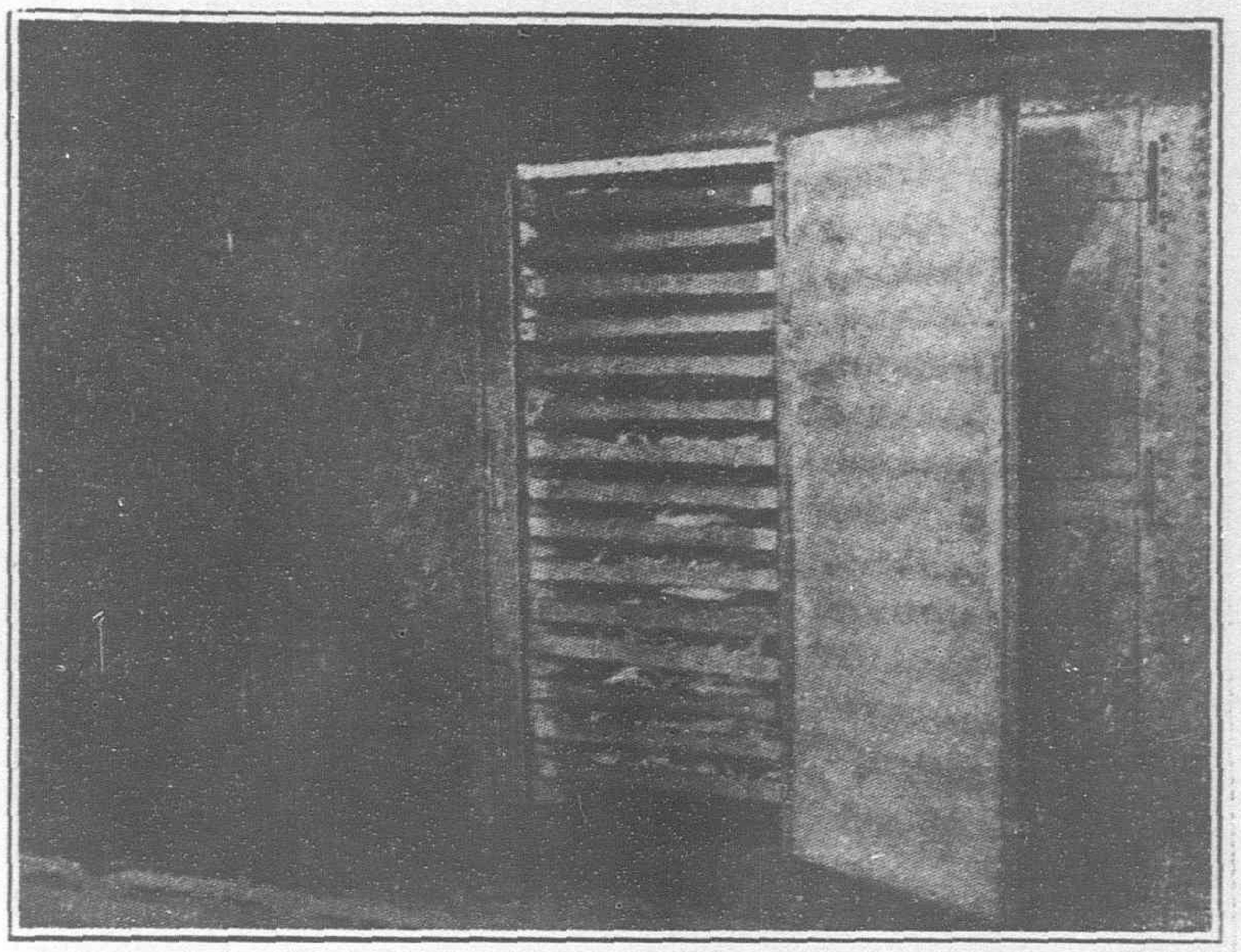
Kiln Drying: The Halves of the Coconuts are Placed over the Grill for the Preliminary Drying



Kiln Used for Drying Nuts



A Unit of the McCord Hot-air Copra Drier



A Unit of the McCord Hot-air Copra Drier, showing the Arrangement of Trays in the Drying Chamber

After husking, the nuts are cut in halves by a sharp blow with a bolo, which, where the copra is sun dried, are placed face up in the sun to dry for a short time until the meat separates from the shell. After this has been attended to the drying of the meat is completed in the sun and the copra is then ready for the market.

A few artificial copra driers are now being operated, but the amount of copra thus produced is still insignificant and for all practical purposes all the copra in the Philippines is still sun-dried or smoke-dried. In the sun drying the halved nuts are first spread on the ground; as the drying proceeds the meat is collected and placed on palm-leaf mats. The smoke or "tapahan" dried copra is produced by placing the meat on bamboo screens over a crude furnace from which the heat and smoke rises and passes through the bamboo screen and meat. A high-grade product suitable for the manufacture of edible products cannot be made with the "tapahan" drier, which cannot be too strongly condemned, and as a matter of fact the abolition of this system of drying is only a question of time, when the difference in price between clean, sun-dried or machine-dried and smoke-dried copra will be so great as to automatically force the "tapahan" drier out of business.

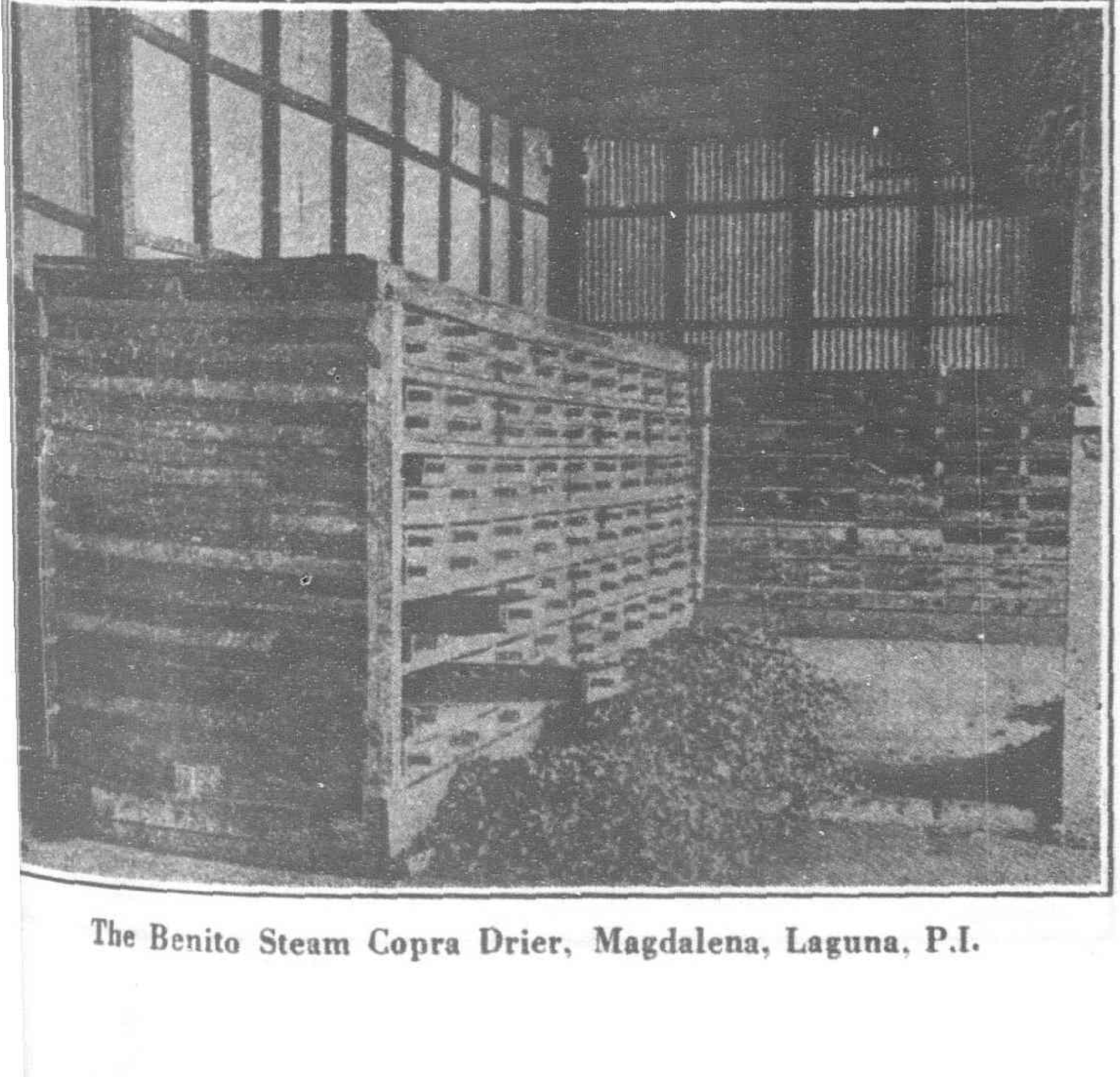
In the rainy coconut districts artificial driers will of course be imperative, but in those regions where the bright days are sufficient to render the perfect drying of the meat practicable, for instance in Cebu and Bohol, sun-drying is particularly well adapted to the needs of the small, individual producer, for sun-light and heat may be had without the asking. However, in order to produce a better and cleaner copra, the present custom of spreading the coconut meat upon the ground should be discontinued. Trays should be made of bamboo, upon which to place the meat for exposure in the sun the same as is done in drying fish. Not only would copra prepared in this way command a premium because of its cleanliness, but the handling of the meat itself from the time of placing it in the sun until sacked would be facilitated; in the case of threatening rain it would easily and rapidly be placed under shelter.

In the largest coconut-growing areas, however, the planter must reckon on the installation of an artificial drier if he desires to produce a high-grade copra.

In the case of the small planter the obvious course to pursue would be either to sell his nuts or to organize a co-operative drying enterprise.

Modern copra driers may be divided into two types, those where the meat is dried by means of superheated steam, and those where the meat is dried by hot air. Both types are such recent inventions that we may expect considerable modifications in the models now in use until more perfect driers shall have been perfected.

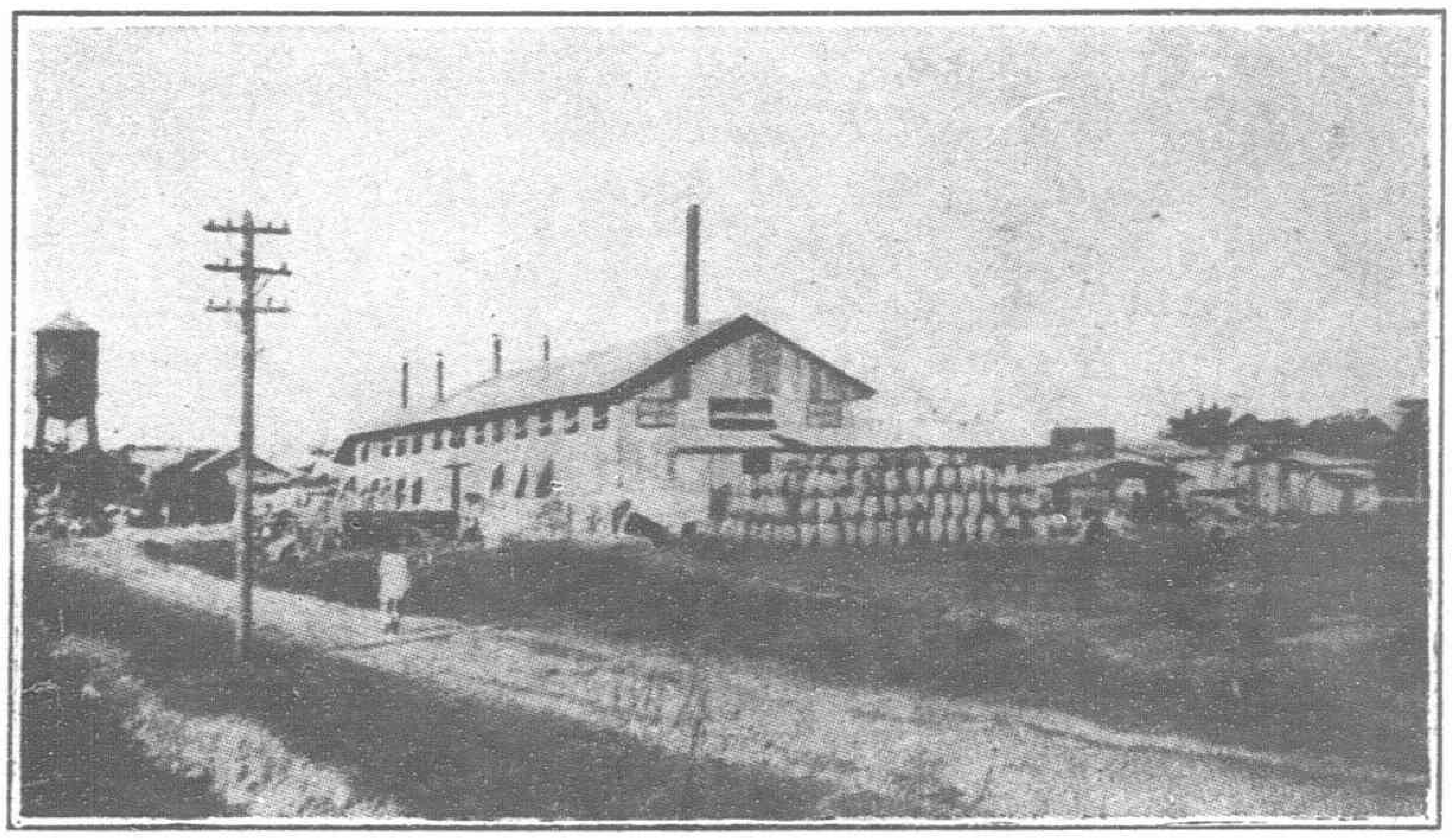
Probably the first steam-heated drier was designed by Mr. O. W. Barrett, in 1911, then chief of the division of horticulture



The Benito Steam Copra Drier, Magdalena, Laguna, P.I.

Native Coconut-oil Press, Laguna, P.I.

of the bureau of science. This drier was constructed of sheet iron with asbestos lining between the iron sheets. The steam entered the drier from the boiler in a section of pipes laid in the bottom, above which were trays on which the halved nuts were placed.



Copra Central, San Pablo, Laguna, P.I.

A modification of this drier was later constructed by Pedro Benito in Magdalena, Laguna, in which the steam pipes instead of all being placed at the bottom were installed at different heights between the trays, an obvious improvement in that it insured more equal distribution of the heat. At the San Ramon Farm, Zamboanga, Mindanao, a steam drier has also been installed where the meat is placed in large trays above a system of pipes. All these driers produce copra of good quality, but much remains to be done before the apparatus is perfected so as to render better service commensurate with costs of construction and operation.

One of the most efficient and compact hot-air driers in use in the Philippines to date is probably the McCord drier. This drier, which has been patented and is now manufactured by a company in Manila, is made in units containing eight drying chambers or in double units of 16 chambers, with four doors on opposite sides. Each chamber is 1.13 metres high, 51 centimetres wide and 59 centimetres deep, and contains 15 shallow trays of perforated sheet iron or wire netting which are slid into the chamber on narrow sheet iron flanges. The walls are made of sheet iron with space under and between the drying chambers for the passage of the hot air, this space between the drying chambers being 75 millimetres. The inside walls of the drying chambers are provided with openings for the ingress of the hot air from the bottom and the sides. The moisture-laden air is discharged through a large circular vent at the top. In operating the drier, air is forced by the means of a blower into a chamber above the furnace made in concrete on the level of the floor to be heated ; from there the hot air is then forced through the aforementioned air passages and into the drying chambers containing the coconut meat, whence the moist air, as stated, passes out at the top. Copra containing not more than 5 to 6 per cent. of moisture is turned out of this drier after four hours of drying, the capacity of a double unit at one time being 365 kilos of copra. Under pre-war conditions the cost of construction of a double unit was P.2,500 exclusive of concrete work, power machinery and blower. The McCord drier is well worthy of investigation by any one in the Philippines contemplating the installation of a copra drier.

Another copra drier that appears promising has been invented by Mr. J. L. Pierce, Manila. This is also a hot-air drier. The meat is fed into the drier on an endless wide belt on which it is carried through the machine at a slow speed. The dry copra is passed out of the machine after four hours of drying. A McCord drier including three units or 48 drying chambers is now successfully in operation in San Pablo, Laguna. This drier has a blower that forces 13,000 cubic feet of air per minute through the drying chambers and requires an engine of 12 horse-power.

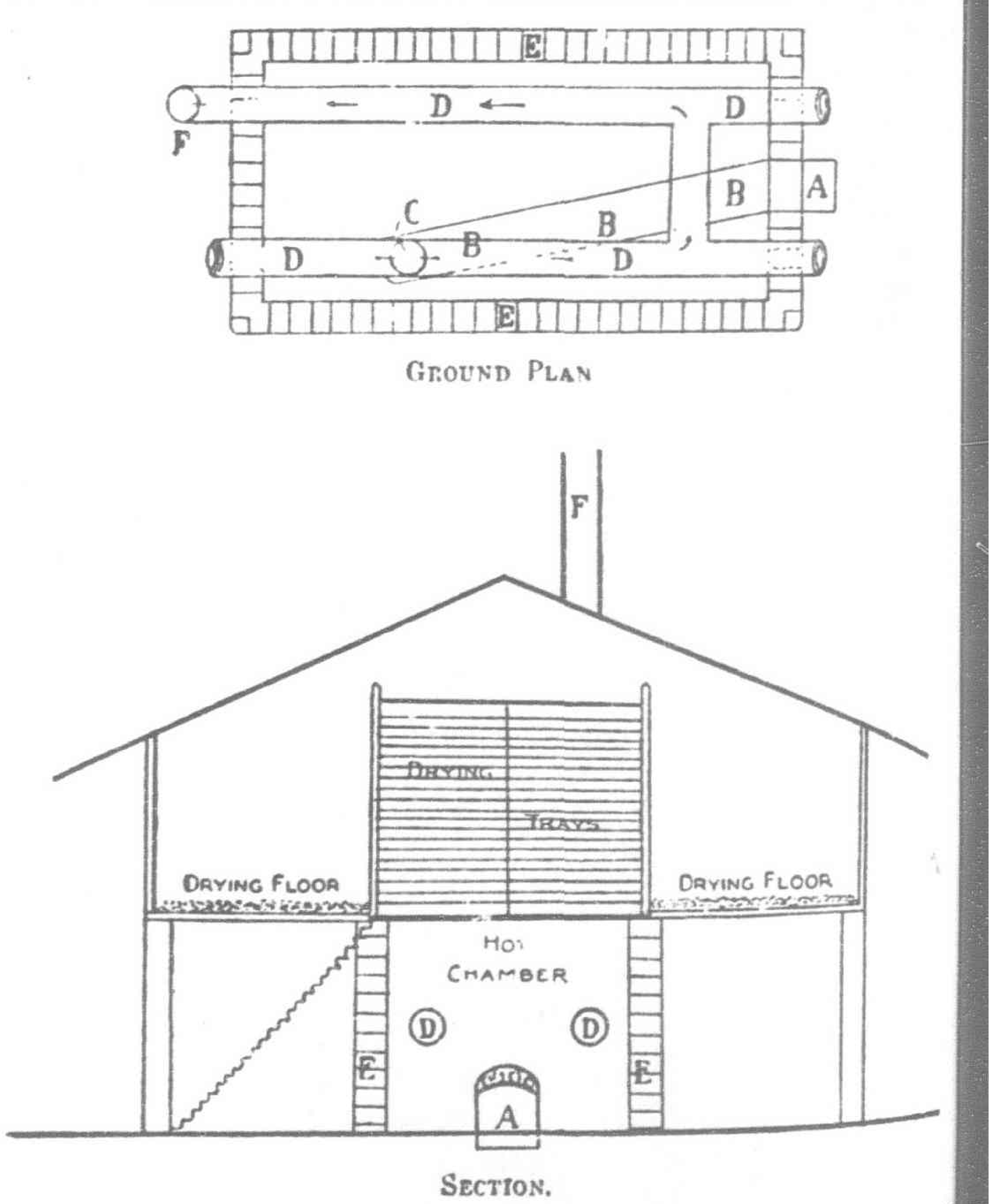
The drying outfit includes a steam boiler for the generation of steam, and a wooden steam vat in which the nuts are steamed preparatory to drying, divided into six compartments. Each compartment is 2.10 metres long, 1.30 metres wide and 1.25 metres deep, with a capacity of 2,000 nuts. The top is hinged so that it can be entirely opened to receive the nuts. The floor is inclined to one side of the compartment which is hinged downward, so that when the steaming of the nuts has been completed and the door opened the nuts automatically roll out upon a platform where they are halved.

The copra manufacture here proceeds as follows :

After being husked, the nuts are thrown into the box and steamed about 10 to 15 minutes. The nuts are then halved, and the meat separated from the shell, which is easily done because of the steaming. The meat is then placed on the trays in the drier and after a period of four hours, which is sufficient to expel the water in the meat, is taken out of the drier, and the dried copra conveyed to the cutting machine through which it passes before being bagged ready for the market.

Dr. E. B. Copeland, formerly dean of the College of Agriculture, Los Baños, quotes in *The Coconut* the following description of a type of copra-drying house used by the Deutsche Handel- und Plantagen-Gesellschaft in Samoa:—

The house the outer walls of which are supported by wooden posts set in cement, is set over a smaller room of masonry, in which the air is heated. This hot room is, in one of the driers described as typical, 5 metres long, 2.3 metres wide and 2.3 metres high. Set into the wall of the middle of one end is the fireplace. A flue of stone runs from the fireplace obliquely, well toward the outer end of the room. It is there connected by a vertical piece of tubing with a horizontal system of sheet-iron flues consisting of two or three lengthwise sections (two in the figure) and the neces-



GROUND PLAN

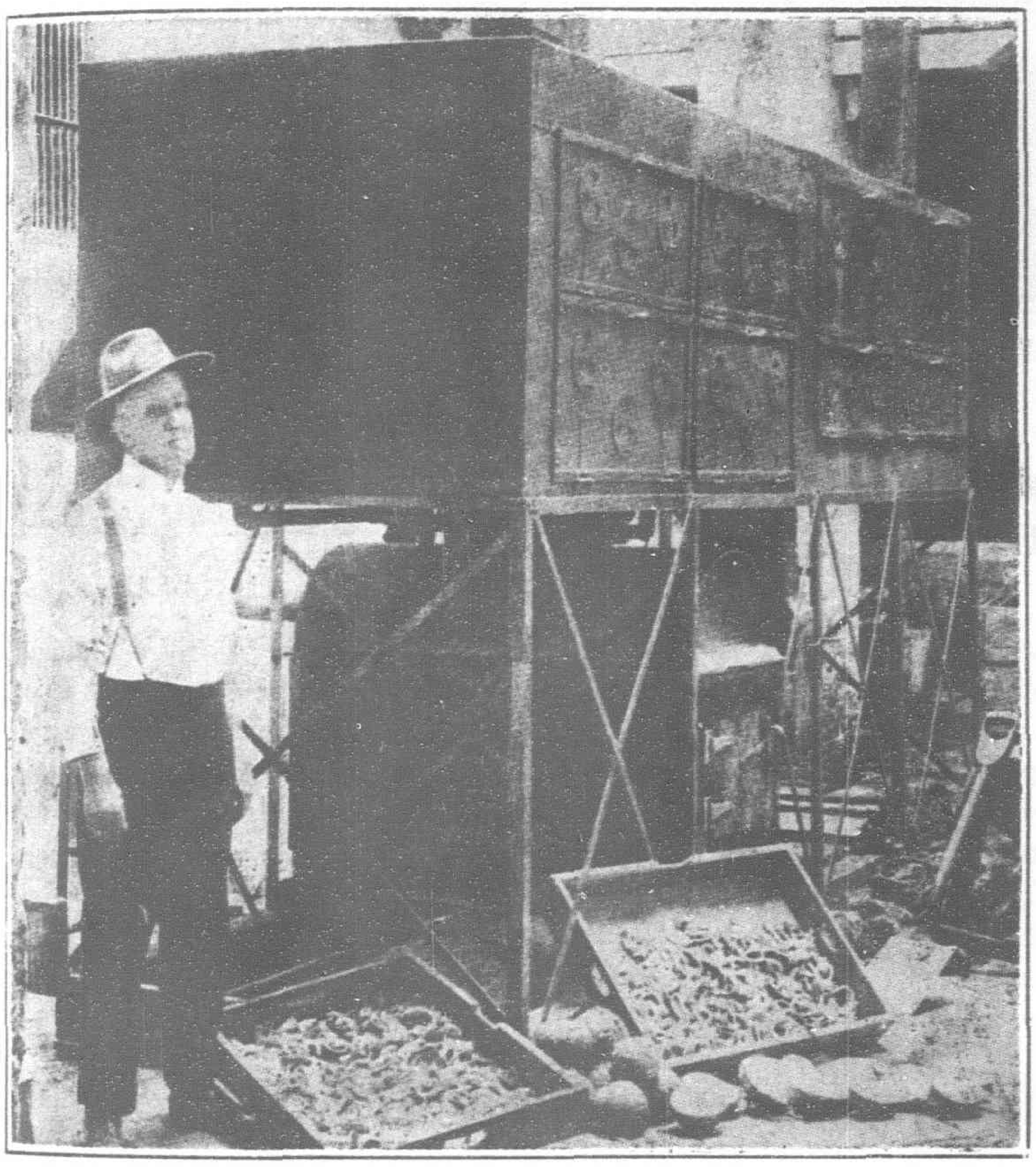
SECTION.

Copra drying house in Samoa. Ground plan and cross section A, furnace, B, masonry flue; C, connection of masonry and iron flues; D, iron flue; E, stone wall; F, chimney.

sary crosswise connections. The iron flues are 30 centimetres in diameter, made locally from sheets. The ends project beyond the walls, and can be opened when the pipes need cleaning. The last flue ends in a chimney 12 metres high. The course of the smoke is indicated by arrows.

The drying room proper is directly over the heating room and very little larger, and the floor between them is merely a grating. In operation the drying room is filled with trays of copra, each holding about three kilos. Different driers have capacity of 200 to 394 trays. The local custom is said to be to remove the copra from the shell without any preliminary drying, which is laborious and inevitably involves breaking it into small pieces. Assuming a yield of 2 tons a year per hectare, a drier then will take care of the yield of 150 hectares. How large an area can well be made tributary to one drier depends of course on the means and cost of transporting the nuts as well as on other local conditions.

In German New Guinea and the Bismarck Archipelago a drier is built for each hectare. Preuss states that one of them will dry 1,700 pounds of copra in 24 hours or 300 tons a year. The temperature is kept near 50° C. When the copra is taken from the drying chamber it is spread over the floor of the building to cool and to dry a little more perfectly. Unless the drying is finished in this way the copra is said to mold ; but with proper treatment the product is of excellent quality. One of these drying houses costs P.3,000 to P.3,500.



McChesney's Hot-air Copra Drier

Steam Drier.—Some time ago the bureau of agriculture introduced a drier containing a series of 2-inch (50-millimetre) tubes, placed near the bottom, through which the steam for drying the copra was introduced. The grade of copra produced by this apparatus was very good and it was found that perfect control could be had in the manipulation of the drier. The steam in this case was produced from the husks and shells of the coconuts under an ordinary boiler.

Another drier has been in use in Laguna province which aims at a better distribution of the heat by having its steam pipes arranged through the apparatus at various heights instead of at the bottom only.

The Mayfarth Drier.—This apparatus is built on distinctly different plans from the above. A blast of hot air furnishes the heating medium, and the partly dried nuts are moved along during the drying by means of a mechanical arrangement propelled by an operator. This apparatus was subjected to extensive experiments by the Compaixa Tabacalera of Manila.

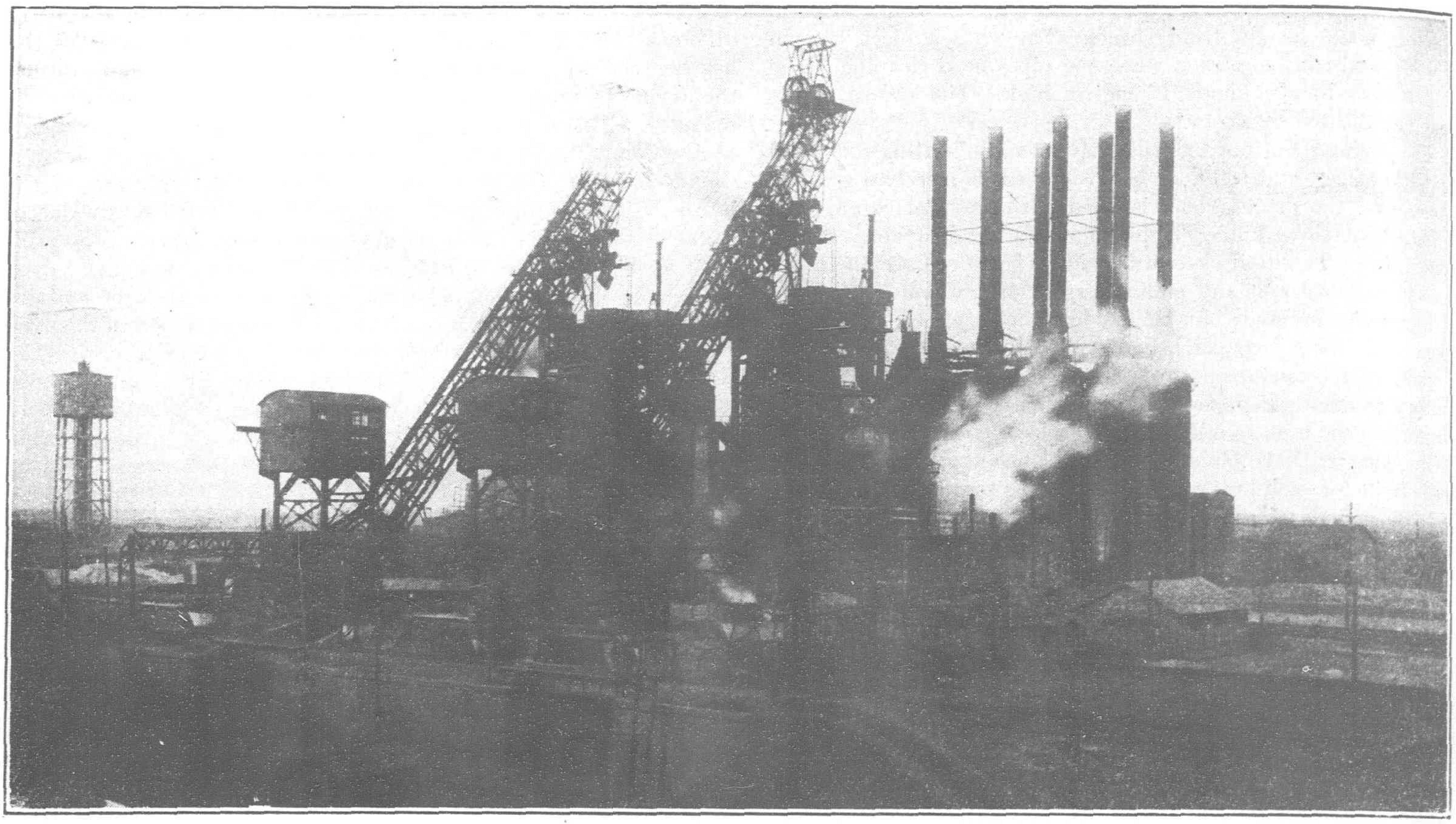
McChesney's Hot-air Copra Drier.—This represents one of the latest designs and one of the very best that has been introduced, so far as the quality of the dried product is concerned. The principle upon which this operates is that air heated in a metal oven placed above the furnace is forced through a series of pipes containing perforations, and thus an air pressure is maintained in the oven itself until a certain amount of the water has been removed. The broken nuts are placed in trays and left to dry for about one hour at a temperature of 90° or 95° after which the shells may be easily removed and the meat cut into strips, which are again placed in trays and dried for about three hours. The temperature during this time is maintained as high as possible without causing decomposition of the tissue, which will result from excessive heat. About three or four hours of this second drying is usually sufficient to produce a first-class copra.

Proper Method of Drying

When the drying is first begun the temperature may be allowed to reach 95° or even 98° until the nuts are ready to be removed from the shell, after which about 85° should be the maximum temperature for the first hour and then a gradual drop should obtain for the two succeeding hours until 65° is reached. Great care must be exercised when the final product is nearly secured, since at this time decomposition from heat may easily result. It is thus better to use a lower temperature and more time during the final drying. Copra dried under these conditions and properly packed should keep well and contain a minimum of fatty acid. Such copra should therefore command the highest price in foreign markets, and cost the producer probably less, or at least no more, than copra obtained by the old methods. One advantage in producing a superior article in any line is that there is always a sure and steady market for this product as well as an opportunity to secure the highest market price.

Chinese Railways

Government railways in China cover 6,410 kilometres. Provincial and private railways cover a further 773 kilometres and "concessioned" railways 3,780 kilometres. Thus the total length of the railway systems of China is 10,963 kilometres, or 6,813 miles. China has, approximately 54,000 of population per mile of railway in operation. This compares in very striking fashion with India, which has 13,000 of population per mile of railway, and in making the comparison it must be remembered that in India a wide extension of the railway system has for many years been held to be one of the essential needs of the country. On the other hand the extensive use of waterways in China will always serve to keep these railway average figures higher than in other countries. The government bureau of economic information at Peking, which draws attention to these statistics, gives at the same time a summary of the results of the working of Chinese railways in 1919 and 1918. In 1919 operating revenues at $83,047,390 showed an increase of $5,395,237, while operating expenses, at $38,440,541, were $4,117,925 higher. After deducting all charges, the true net surplus in 1919 was $36,449,392, against $33,505,120 in the previous year. The railway system now operating in China is located principally north of the Yangtze River. The Shanghai-Nanking, the Shanghai-Hangchow-Ningpo, and the Hupeh-Hunan lines extend the system into South China. Construction plans are on foot to connect up other short lines operating in the south.



Anshan Steel Works

ANSHAN IRON MINES

THE iron belt of Anshan stretches to Penchihu and holds an immense quantity. The concession held by the Chenhsing Mining Co. includes a region within a radius of 7 or 8 miles with the Anzan Iron & Steel Works as the centre. There are altogether eight mining districts—one each at the east and west of Tangkangtzu Hot Springs styled Hsiaolingtzu and Tiehshihshan. South of Chienshan Railway Station with the railway track running across, there are East Anshan and West Anshan. Takushan lies on the way to the famous Chienshan Mountains. Northeast thereof, there is Kuanmenshan. Turning northward one will come across the two more mines—Wangchiaputzu and Yingtaoyuan. In the main, they fall under the head of hematite mines, but a few of them are mixed with magnetite. Takushan mine contains a comparatively large quantity of magnetite. The same thing may be said of the edge of Wangchiaputzu. The ore bed shows its outcrops on the top of the hill. Although the prospecting work is left unfinished, which circumstance renders an accurate estimate impossible computed on the bases of the outcrops, the average percentage of East Anshan Mine is 27 per cent.; that of West Anshan 30 per cent.; that of Takushan 37 per cent.; that of Yingtaoyuan 28 per cent.; and the others are very much the same. The past experience in mining and prospecting indicates the presence of rich ore in each mine, and if operated on a picking principle, an ore of from 40 per cent. on an average or even of 60 per cent. on an average is obtainable. Up to this date, the picking plan has been pursued in order to supply material to the Anshan Iron and Steel Works. However, rich ore exists irregularly, and is found scattered all over the district in quantities of widely varying range. Accordingly there is no depending on the sureness of supply, for the supply may be exhausted to-morrow. Above all, the rich ore occurs only in a limited amount, as may be easily imagined. Still, the poor ore as above enumerated is hardly suitable as material for the blast furnace. Especially the iron ore of Anshan is generally compact and its particles are very fine. Moreover, almost the whole of the impurity is made up of silicious stone which impedes the smelting process. This state of things would seem to put a very pessimistic complexion on the utility of the Anshan iron mine. However, it holds iron to the amount of over 100,000,000 tons, and this great treasury of nature must be opened somehow. The key to a like treasure house has already been found in the West. Poor ore of a similar quality may be subjected to a mechanical handling to get its impurities to be removed so as to make an artificial rich ore.

Ore-Concentration and Briquetting of Anshan Iron Ore

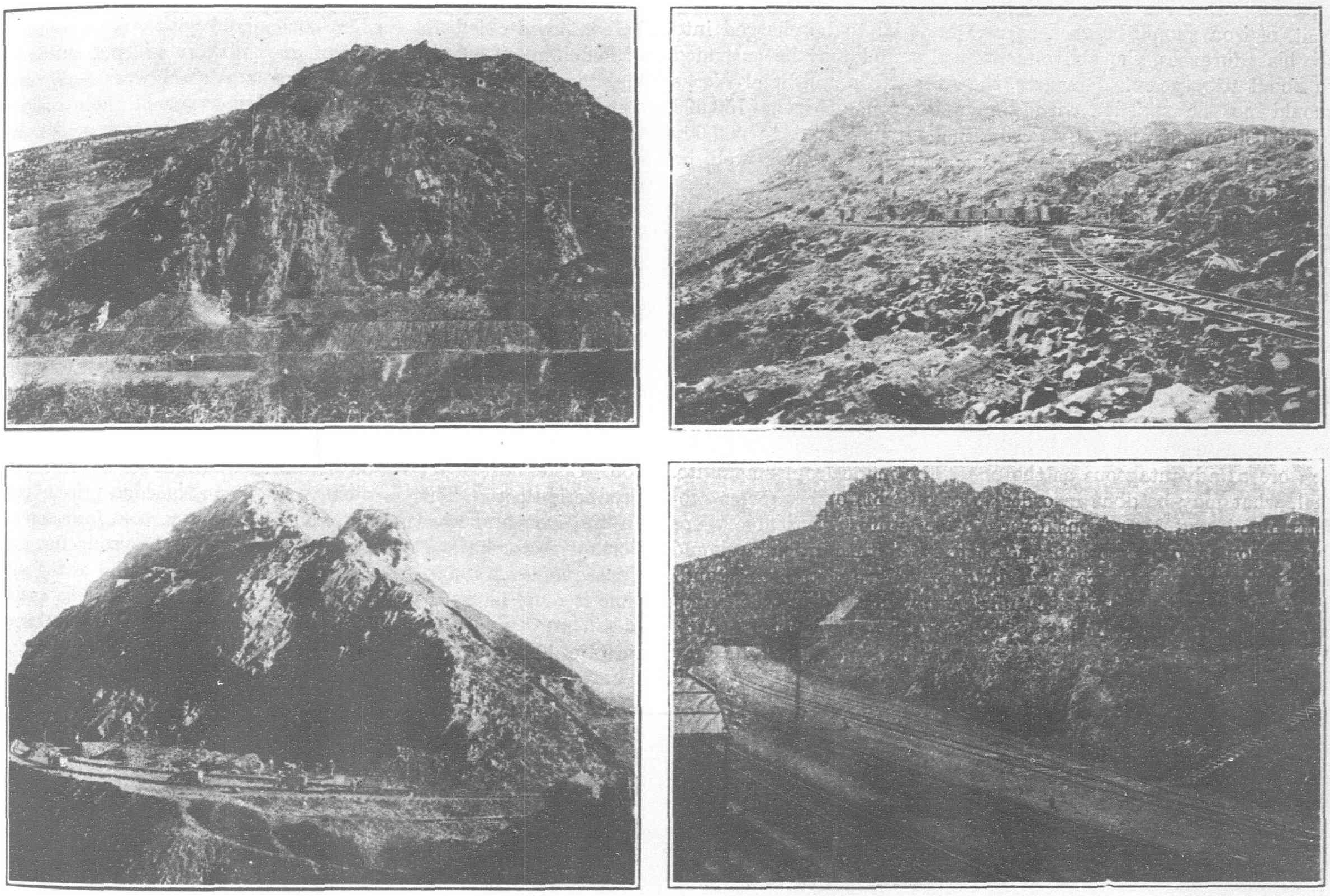
The iron ore of Anshan is required, prior to being ready as iron manufacturing material, to have its economic value improved by a dressing process. The dressing of iron ore has been developed these twenty years and is in vogue at many places in the West. The method varies according to the nature of the ores. With magnetite, its strong magnetic quality is availed of and what is called magnetic dressing is adopted. Then, with hematite and others, dressing by specific gravity is applied. What is now in most popular use is the dressing of poor magnetite ore. The dressing of hematite is found in the instance of the special class of ore occurring in the Mesaba belt, Minnesota, and outside this, it is conducted supplementarily to the magnetic dressing method.

The Anshan ore, as already stated, is composed mainly of hematite, and only part of Takushan and Wangchiaputzu mines contains magnetite. As to the Takushan ore, from both experimental tests and actual examples in foreign countries, it may be effectively handled by applying some dressing device adapted thereto, but as regards the hematite which makes up most of the ore, there is no foreign examplv to serve as guide. Nor has this subject been exhaustively studied.

However, three methods may be suggested, that is, (1) Dressing by specific gravity, (2) Magnetic separation, and (3) Magnetic separation after the hematite has been reduced into magnetite.

What is considered as the most promising at present is (3). The results reaped from experimenting upon this method in Sweden were exceedingly satisfactory, but for applying it to practice as a business venture, further study is required. The second method is also promising, but the need of large capital is its chief drawback. The first method is unsuited to the Anshan ore. Thus the question of dressing hematite which takes up the large portion of the Anshan ore can hardly be regarded as solved, although its solution seems only a question of time, once the method therefor has been decided upon.

The ore-dressing must be accompanied with briquetting. Ore-concentration is, in most cases, conducted by crushing the ore into a pulverized state, and for this reason, the refined ore obtainable by ore-concentration is found in the form of powder, which is unsuited to be charged into the blast furnace. It must be converted into briquets. There are two ways of making briquets. One is by the use of heat; the other is by the use of a cementing material. The former method is the more popular and has three different processes. One is nodulizing; the second is sintering; and the third is briquetting. In the nodulizing process, something like a revolving furnace used at a cement factory is used to make dust ore into briquets. In the sintering process, the rich dust ore is put in the roasting furnace, mixed with pulverized coal, coke, charcoal, etc. This mixture is then ignited and, by means of ventilation, the pulverized fuel mixed with the dust ore catches on fire and changes the dust ore into briquets. By briquetting is meant to make dust ore into the from of brick by mechanical appliances and to bake it in the furnace.



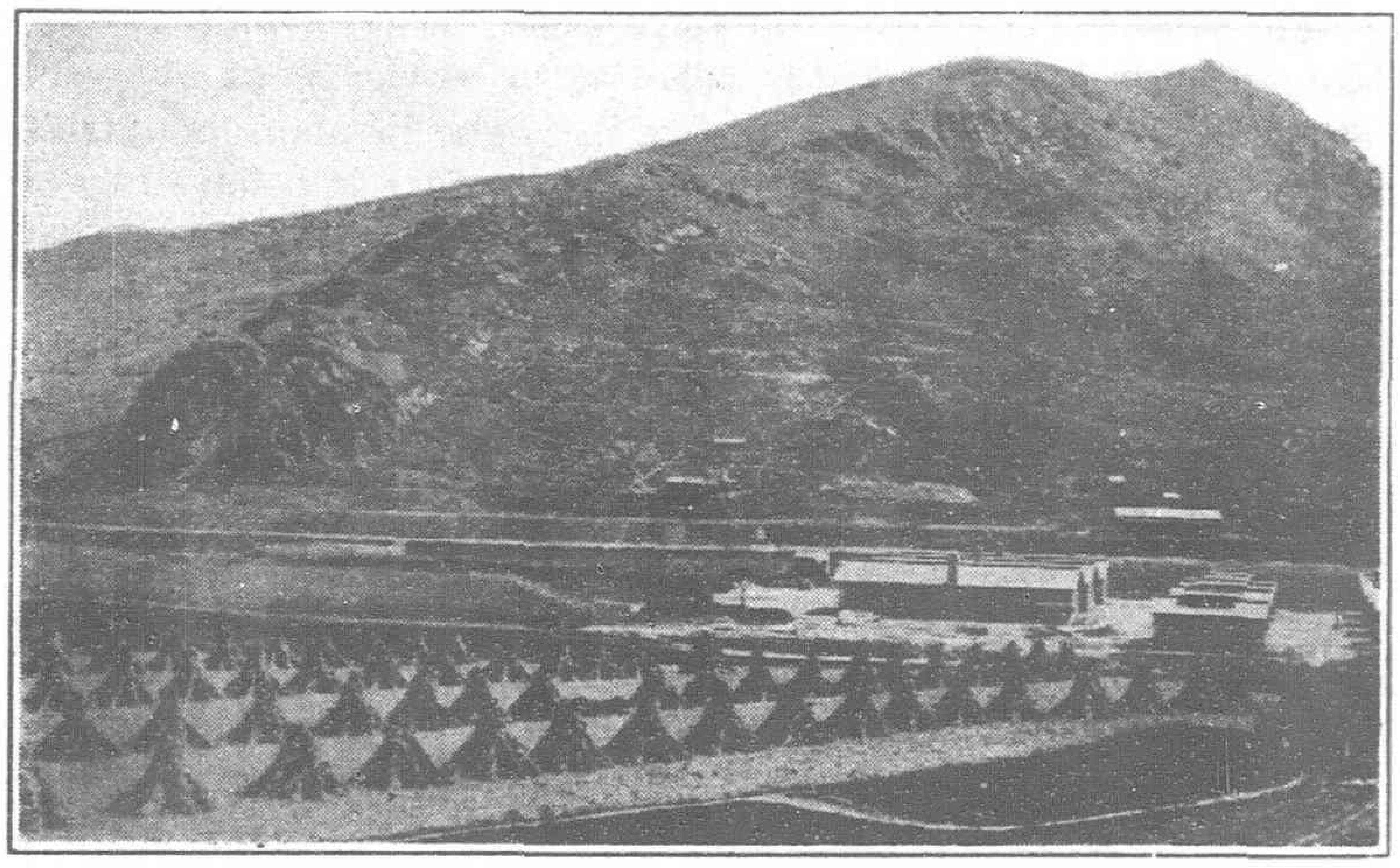
Views of the West Anshan Iron Mines, Operated by the South Manchuria Railway Company

The above three methods have their own advantages and disadvantages, but sintering is believed to be the most advanced method. All the three methods are in vogue in many countries, and the only thing to be done is to choose what is believed to be the best.

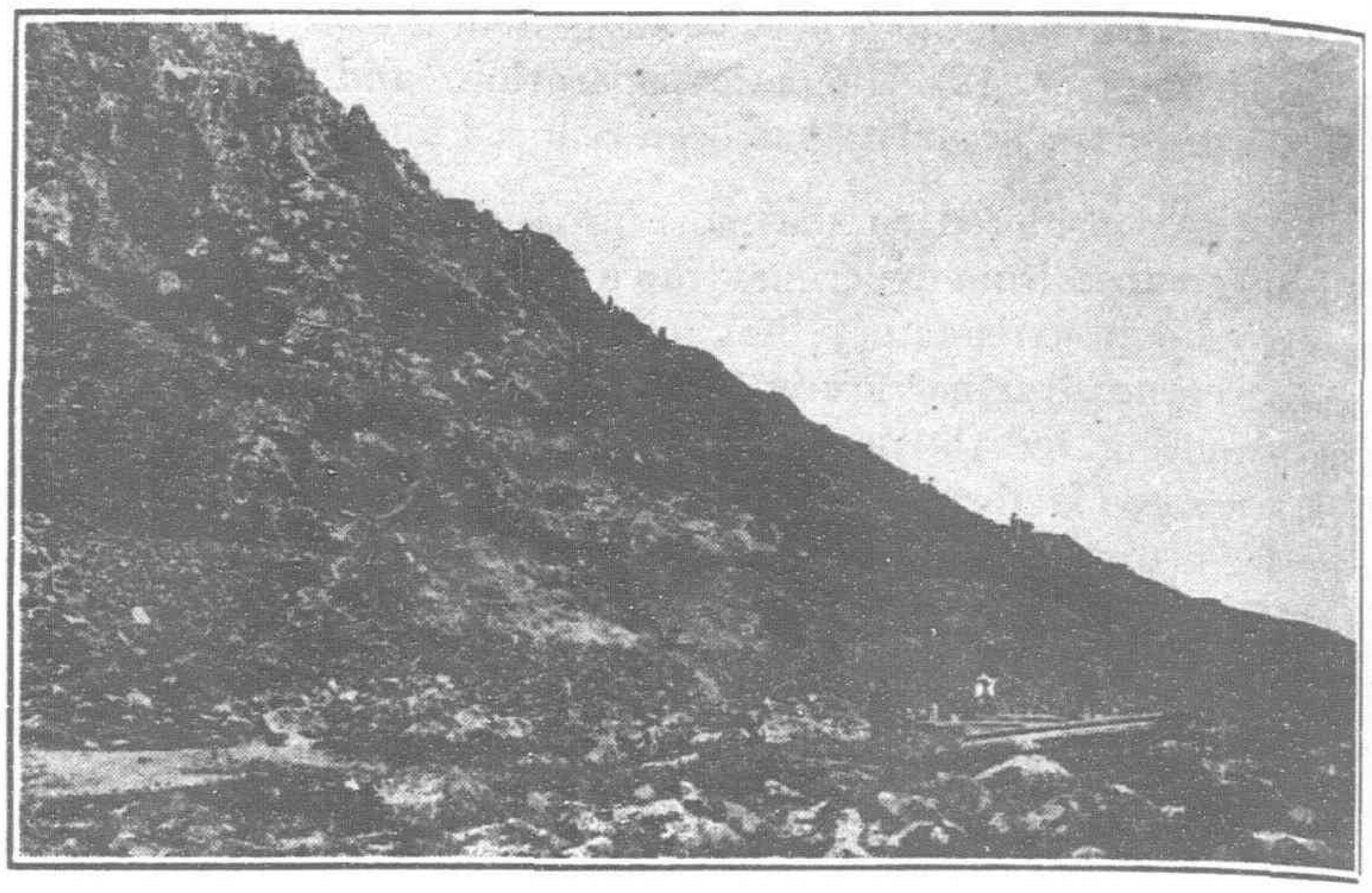
Future of Anzan Iron and Steel Works

The Anzan Iron & Steel Works was originally planned to put out 1,000,000 tons of steel a year. In the wake of the completion of the first part of the program, the second and third parts of the same program were to have been executed. But owing to sundry circumstances, the extension work lies practically suspended. For instance, the two blast furnaces have already been completed, but the steel works that ought to be attached to them has no immediate prospect of being brought into existence. What should be done with the Anzan Iron and Steel Works is a serious and interesting question which deserves careful study from divers points of view. Apart from such practical question, we shall speculate upon the future of the Iron and Steel Works on the bases of the fundamental conditions of its establishment, that is, the supply of raw materials, the markets for the products, etc. The raw materials are iron ore, cokes, lime stone, etc.

As to iron ore, by the application to magnetite of Takushan of the ore-concentration and briquetting methods for magnetite which have been so happily and economically solved in the West, an artificial rich ore containing more than 60 per cent. of iron, which is decidedly advantageous, may be obtained. Supposing that this artificial rich ore be supplied to the two blast furnaces, a roughly estimated consumption amounts to 350,000 tons. From the estimated ore reserve of Takushan Mine, it may have sufficient to last about thirty years. If the mixture of 66 per cent. of the artificial rich ore and 33 per cent. of natural ore containing 40 per



East Anshan Iron Mines

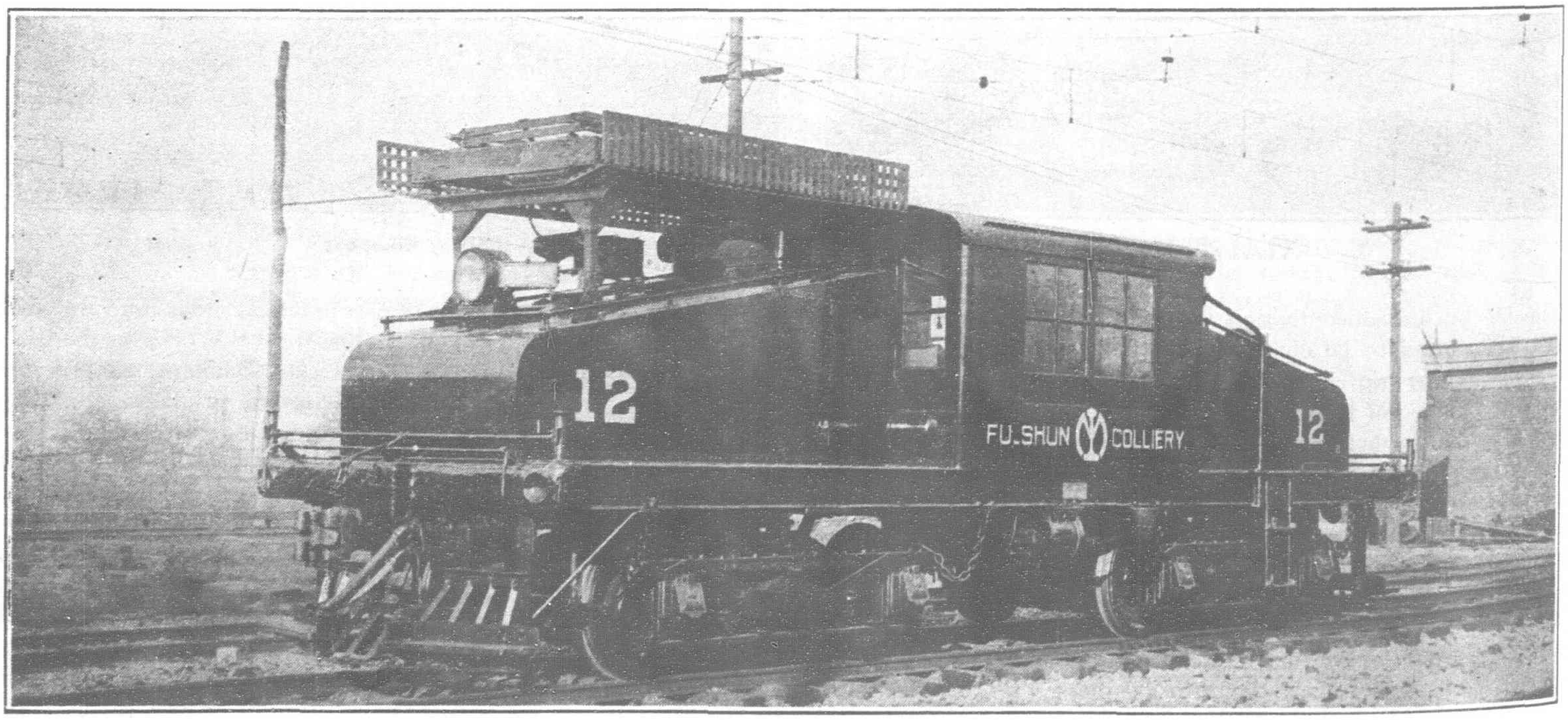


East Anshan Iron Mines

cent. of iron should be used as raw material to be charged into the blast furnaces, the above-mentioned period may be extended to about fifty years. However, the Anzan Iron and Steel Works should not be satisfied with the production of from 150,000 to 200,000 tons a year. By raising the annual output to 500,000 tons, nay even up to 1,000,000 tons, the Works may well be regarded as worth founding.

When such possibilities are considered, the exploitation of Takushan Mine alone will not do. The utilization of the major portion of hematite as raw material by all means would be absolutely necessary for the annual production of 500,000 tons to 1,000,000 tons a year. It is on this account that the problem of the briquetting of hematite assumes a most significant complexion. It is regrettable to say that, with hematite produced at Anhan, no tangible instance of a satisfactorily economical solution has yet been known, nor has the study of the same subject advanced, and therefore it can hardly be said conclusively that it permits of conversion into an artificial rich ore as advantageous as the one to be made from magnetite. Still, what may be done in order to attain this object seems predetermined and it is considered to be quite practicable. For this reason, a proper or adequate study of this problem should be prosecuted and, we are made bold to believe that little stands in the way of getting ready the sufficient raw material for the manufacture of 1,000,000 tons of pig iron a year at some future date. Cokes are made from coal by dry distillation. The coal may be composed chiefly of Fushun coal mixed with suitable amounts of Penchihu or Kaiping coal, and the mixture will put out a coke highly suited to the use of an iron and steel works. We may speak with confidence from the coal reserves of these collieries that their supply will prove quite adequate. Limestone is in less demand than the ore and cokes, and the district, in which the new Works stands, abounds in limestone.

As above stated, there is no reason to fear the shortage of the principal raw materials for the Iron and Steel Works. Seen from its relation to the raw materials only, the Anzan Iron and Steel Works stands in a more favourable position than any of its likes in Japan. Moreover, the very fact of its being located in the midst of the iron ore belt, an efficient raw material may be obtained at a comparatively moderate rate even if some outlay may be required for the ore-concentration. Even now, the iron ore is supplied on very moderate terms. The cost of the iron ore does not amount to 20 per cent. of the production cost of pig iron per ton. Cokes cost dear nowadays, taking up about 40 per cent. of the production cost. This is owing chiefly to the high price of coal. In the iron and steel manufacturing industry, coal forms an important factor having a serious bearing upon the production cost. Consequently, its supply on low terms is essential, and at the same time it must be used in the most effective manner. The quality of an ore is closely related to the quantity of coke to be charged into the blast furnace.



Class 404-E-112-4 G.E. 207-1200 Volt Electric Locomotive, operating at the Fushun Collieries of the South Manchuria Railway

To return, the collieries supplying coal, the primary raw material cannot be said to lie at great distances. Furthermore, these collieries being closely related to the management of the Iron and Steel Works, there are ample facilities available.

The most convenient market for the product is Japan, as may be seen obviously. Supposing that a Steel Works turning out 1,000,000 tons of pig iron a year should exist to-day, the Japanese market can easily digest the annual product. The only question to be considered is the competition with the foreign imports. However, from the point of distance only, the Anshan products are at an advantage, compared with the foreign imports. If the cost of production should not be much dearer, the Anshan manufacture would have fair chances to come out of the competition favorably. But, the present day ability of the Japanese is feared to fall short of directing and manipulating this complex and gigantic enterprise. Furthermore, they are lacking in experience. Naturally, the producing cost will be raised, making the Anshan product placed awkwardly in competing with the foreign imports. Such a state of things cannot be regretted too much. But, it would be too much to expect an easy success by aping the intricate industries of the West, in which the technical geniuses and talents have concentrated their energies on the invention and improvement of these industries, raising them to what they are to-day by paying dear sacrifices and by turning to most account the experiences and discipline acquired by efforts of over a hundred years.

Moreover, under the import tariff now obtaining, it might be likened to a mere boy running a race with a grown up athlete. It could hardly be a race.

The steel manufacturing countries like Great Britain, the United States, Germany, etc., adopted a liberal protective policy for steel manufacture at is early stages, and if Japan wishes to foster the same industry, she ought to follow the example. From this point of view, the question of the market for the products of the Anzan Iron and Steel Works may find a solution.

As stated above, the Anzan Iron and Steel Works has little to concern itself about as to either the supply of the necessary raw materials or the market for the manufactures ; it is also feasible for the Works to put out 1,000,000 tons pig iron a year some day. However, as to the practical questions what should be done with the Works and what will become thereof, they remain riddles that will be solved by time only.

Chinese Engineers in Convention

WESTINGHOUSE is not neglecting its future interests in China. The company has opened its factories for the training of Chinese electrical engineers. Their contribution in this direction was emphasized by the delegation of bright young engineers sent from their factory to attend the last joint convention of the Science Society of China and the Chinese Engineering Society of the United States, held last year at Princeton University. These two organizations are made up of Chinese graduates of engineering and scientific schools, their purpose being the furtherance of scientific experiment and learning. Knowing that the future development of their country depends largely upon the advancement of its people in engineering knowledge, Chinese students have seriously pursued these studies in the various colleges of the world. America, while leading in the number of young engineer graduates, has no monopoly in this branch of education, as some of the brightest and most successful of these engineers have been educated in England and the work of the Hongkong University merits great praise. Statistics show that they practically always rank amongst the highest in scholarship.

The convention was a good indication of the serious manner in which these Chinese students in the United States have been pursuing their scientific and engineering work in preparation for solving the industrial problems of their native land. It is largely through such co-operation that the Chinese people gain inspiration for the many scientific and engineering achievements that they are making. The chairman of this convention was Mr. G. Chow of the Westinghouse Electric & Manufacturing Company. The scope of the convention may be judged from the title of some of the papers submitted and the addresses before the convention. Miss A. Lee, speaking on "Scientific Methods of Education," Mr. G. Chow, on "The Electrification of Steel Mills," Mr. Y. G. Chen, submitting a "Thesis on in Chemistry," Mr. Y. T. Yao, on "Historical Development of the Principle of Relativity," Dr. C. H. Hu, on the "New Knowledge of Nutrition" and H. C. Wang, on "Railway Signal and Interlocking."

THE GROUP FROM WESTINGHOUSE

Left to Right: Front Row: C. S. Young, G. Chow, J. K. Chin
Second Row: N. T. Chow, Molin Ho
Rear: T. Nih

A Silk Testing House for Shanghai

Mr. D. E. Douty, of the United States Testing Co., arrived recently in Shanghai, to establish the Shanghai testing house, authorized by the United States Testing Co. Mr. Douty will undertake the preliminary work of instituting American testing methods in the Chinese market.

The latest testing methods and the most modern machinery will be installed in the Shanghai plant.

The co-operation of the Chinese filature operators in the establishment of a testing house was promised during the International Silk Exposition, when a mission headed by Ting Ju Ling visited New York. At the time of the annual meeting of the United States Testing Co., an increase in capitalization was voted, which, when met with financial assistance from the Chinese, assured the success of the institution in New York.

Rice Milling in the Philippines

Modern Rice Threshing Machines at Work in Murcia, Tarlac, P.I.

DUE to the methods of culture and climatic conditions existing in these islands rice was never grown over large areas under one management, as in California and some of the southern states, until lately, when the introduction of tractors has made it possible to plant rice on a big scale. But tractors can in most places only be used for upland rice. It is impossible to use them in planting lowland palay except by following the method used in California; that is, the field is prepared dry and then the seed is drilled in, as in planting corn, and the whole field is flooded. This, of course, can only be done in places where irrigation water is available.

The tractor, however, has partly solved the labor problem arising from the high cost of wages and the scarcity of field hands. It makes possible the planting of a bigger area and in very much shorter time than by using animal power; it eliminates the factor of loss due to rinderpest and enables the farmer to use drilling and harvesting machinery. True, some modern machinery was tried here some years ago, and failed to give good results; but that was because it was drawn by carabaos and bulls while the speed of the machinery was rated according to a horse's walk, which is faster. At that time no tractors were available so that the heavy machines were found to be impracticable. It must be borne in mind, though, that the land used for rice in most places is not extensive enough and the fields are not properly laid out for modern agricultural implements, and the majority of fields are small, irregular strips of land divided from one another by levees or "pilapil" to form small paddies; so the present method of planting lowland rice is such that the use of heavy machines is inadvisable, as for these to be used successfully in these islands the upland method of planting rice would have to be followed exclusively and all the levees destroyed.

One of the most expensive parts of rice production is the harvesting, as this is at present done by hand.

The use of modern machines is impracticable for harvesting rice in the Philippines except for upland rice; and about three-fourths of the rice planted at the present time is lowland. Machines cannot be used in the lowlands unless the dikes are taken away and the soil drained to make it hard enough to support the weight of the machinery. There are several methods of harvesting practiced—one is by cutting off the ripe heads one by one, or at the most three at a time, with an implement called a "pangani" or "yatab." This is generally used by women and children for harvesting upland or bearded palay. Sometimes the heads are cut off separately and tied together in large bundles called "manojos" weighing about ten kilos each. These are placed in the sun until dry and are then put in the house. As a rule only bearded varieties are harvested in this way, unless the fields are under water or the heads have become so tangled together that the crop cannot be cut by the other method. The second most common method is to cut the straw about midway between the ground and the head with a kind of sickle or serrated knife fastened in the back of a crooked branch of a tree and having a hook at the end for gathering the straw into a bunch. This is known as a "lingcao." The hook is held in the right hand; with it the rice is pulled up and grasped by the left hand, the hook is then loosened and the straw cut with the knife fastened at the back of the hook, and tied into bundles about 10 to 15 centimeters in diameter. The bundles are called "haya," by the Tagalogs. They are so uniform that they are used

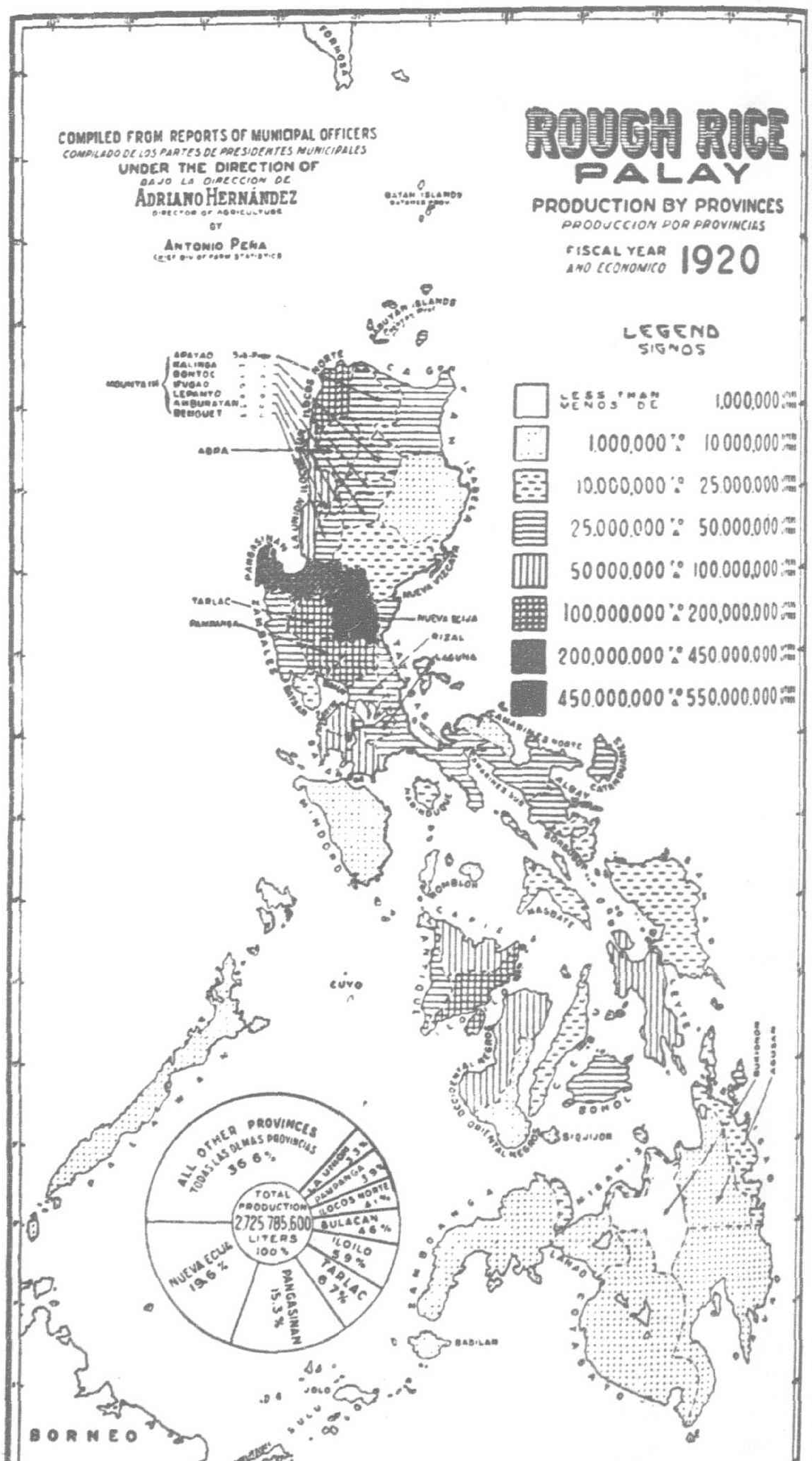
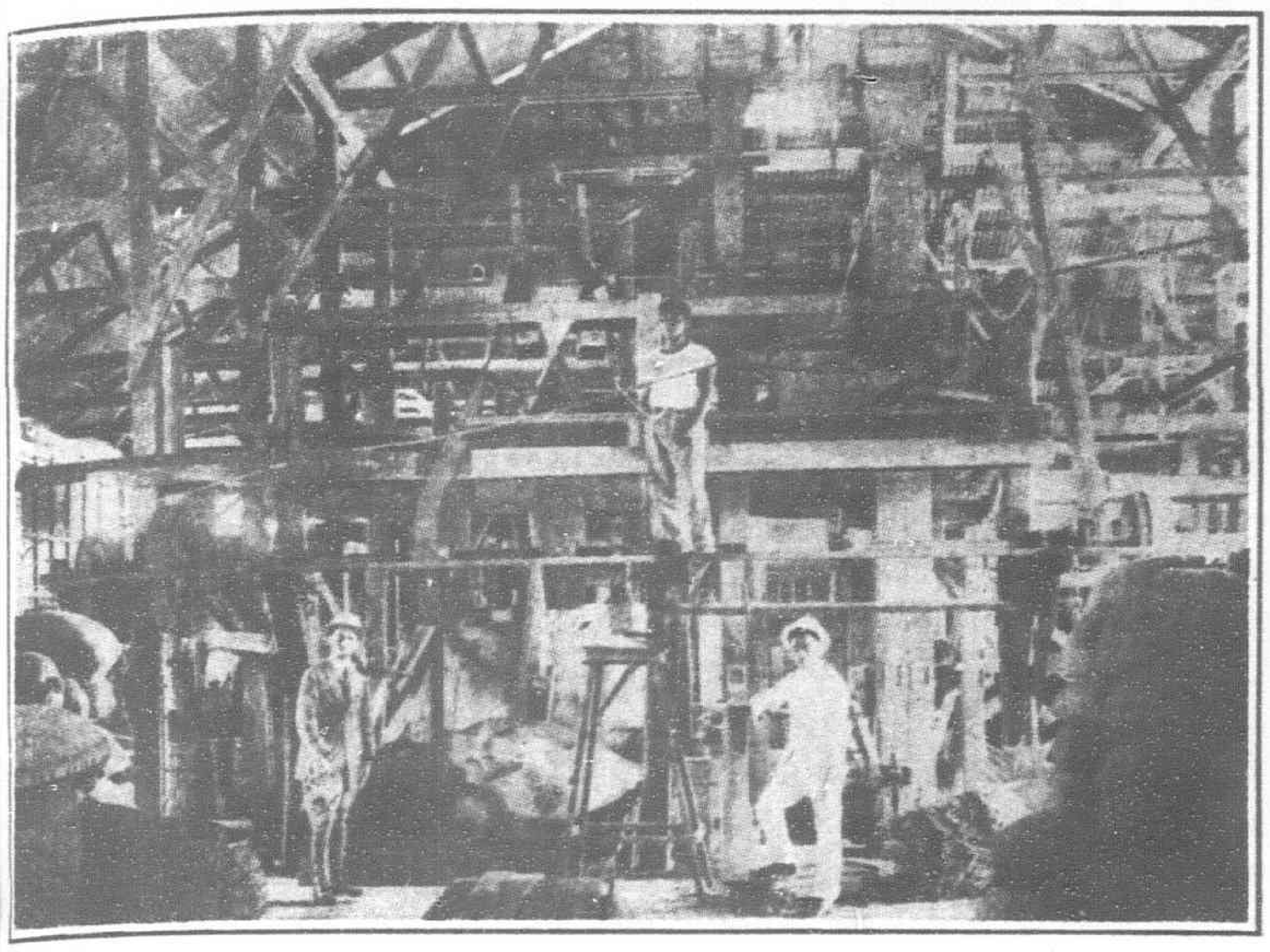


Chart Showing the Relative Production of Rice in each Province of the P.I.

sometimes as a unit of measure, each containing about 0.3 kilo of threshed grain. These are left scattered on the ground to dry until well cured. They are then piled in shocks on the dikes until the harvest is over, when they are hauled to the stack yard and stacked. This method is generally used by the Tagalogs, it being the most practicable. Making a communal job of planting or harvesting where there are many small holdings is more or less a common practice in many provinces, but on big rice farms it is the custom to harvest on the share system, amounts varying from one-tenth to one-fourth of the crop being given to the harvesters and sometimes even one-half when hands are scarce. By this system of harvesting, a skilled harvester sometimes gets several cavans as his share for a few days' work.



Interior View of a Rice Mill in Binacayan, Cavite, P.I.

In some places, harvesters are paid from P.0.20 to P.0.50 with the privilege of carrying away as much rice as they can carry; but in others the harvesters are paid regular wages from P.0.60 to P.1.50 a day. Whenever it becomes possible to use a reaper and binder, the cost of harvesting, the greatest expense, will be much reduced. And furthermore much time will be saved, as one of these machines pulled by animals can reap about five hectares a day.

Threshing

Several hundred modern threshing machines are now being used by some of the big rice planters in the Philippines. At present most of them are found in Nueva Ecija, Bulacan and Pangasinan. These machines move from place to place to thresh rice and payment for the work is made either in money or palay. Small farmers thresh their rice immediately after harvest, usually stacking the harvested crop and do it in so excellent a manner that it is not injured by rain. These stacks are allowed to remain for a month or so until it is full moon or until the weather becomes settled. Threshing is still done in most places by various simple means such as treading out the grain on a hard earthen floor by human beings or carabaos, treading on slatted platforms and beating with flails against stones or hard wooden boards.

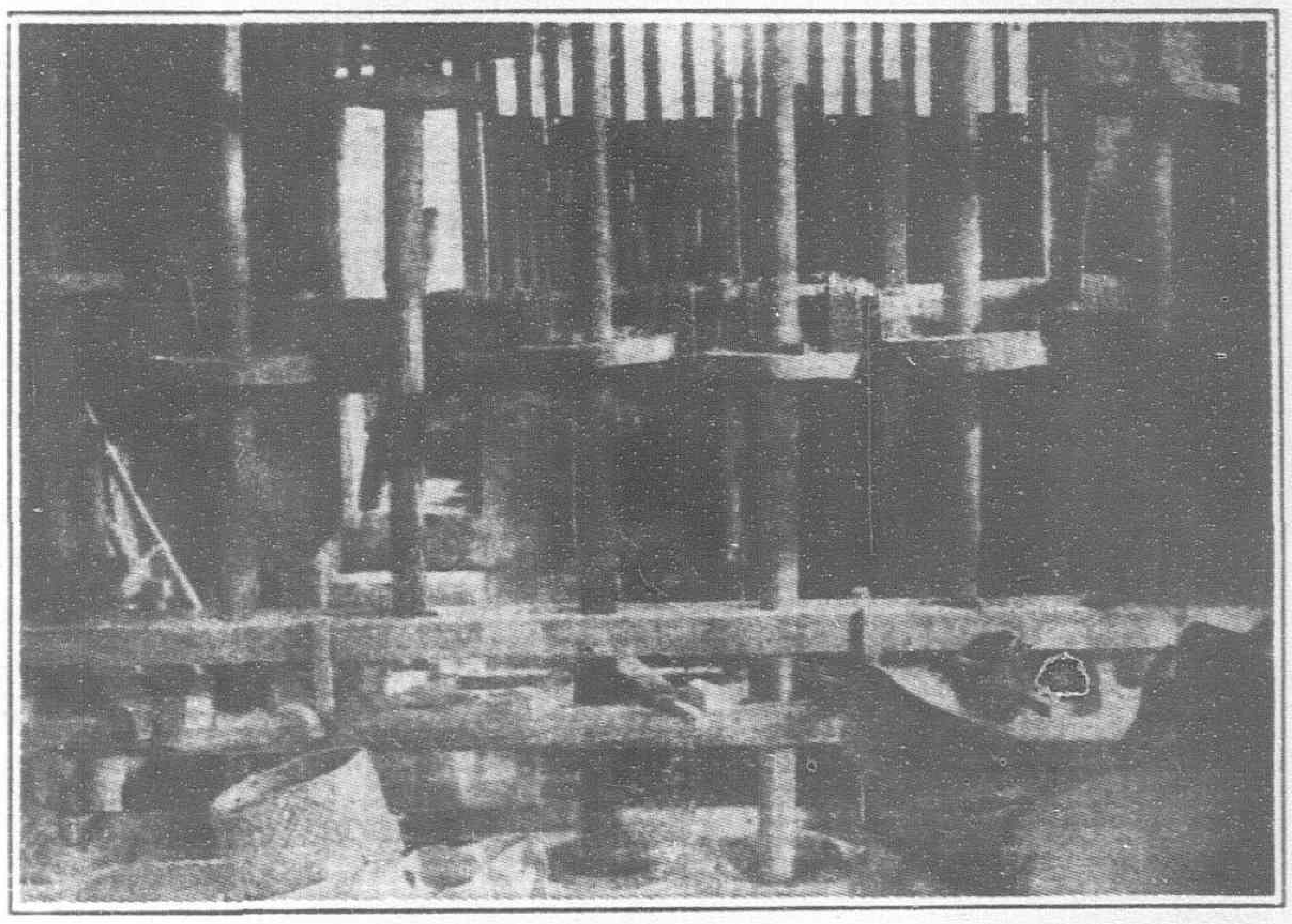
Rice sheaves are spread on the threshing floor and the grain is trodden out by animals driven in a circle. Generally carabaos or horses are used for this kind of work. The animals go on until virtually all the grain is threshed—the small quantity left in the panicles is cleaned by hand or by the laborers' feet. Threshing in this manner is generally done by moonlight. Sometimes a wooden roller with short teeth or spikes is driven over the sheaves and as many as 20 carabaos or horses are used at one time—the more animals there are the quicker the work can be done. Fifteen carabaos or horses when used at one time can easily thresh about 200 cavans of palay in five hours.

When labor and animal power is cheap it is better to thresh rice in this way as the chances for weed contamination, seed mixing, and breaking of the kernels is less than it would be by machinery, as very often there is faulty adjustment of the parts of the machine. One carabao can thresh about 15 cavans of palay in about five hours. Especially when rice is wanted for seed, the threshing machine is not to be recommended, unless perfectly adjusted. Generally from one-tenth to one-sixth of the palay cleaned is given a man as his share for threshing and about one-tenth is given when threshed machine is used.

Rice should not be threshed until the kernel is hard and the straw thoroughly dry and cured. It can be properly cured in a well piled shock, even though exposed to heavy rains and the hot sun. When straw, however, is stacked while damp or green the seed will heat and lose its vitality and produce a soft chalky rice which sells at a low price.

Cleaning

There are two methods of cleaning rice practiced. Poor farmers pound it in a large wooden mortar with a wooden pestle called a "mazo." The first pounding takes off the hull and further pounding removes the bran and germs. Then the hull and rice polish are removed from the kernel by winnowing. For this purpose, a native fanning mill called "hungkoy" is used. The process is rather slow and expensive so that this method is only used when rice is intended for home consumption or when the place is far from a mill. Rice so cleaned, however, does not receive as high a polish as that cleaned in large mills and costs more on the general market, mainly on account of the extra labor it takes to clean rice in this way. This kind of rice, however, furnishes a better ration than highly polished rice, as it contains more protein and phosphorus. It has been found that those who live upon an almost exclusive diet of polished rice are subject to a disease called "beriberi." It is supposed that this disease is due to the absence of phosphoric acid anhydride, which is essential to human life. The unpolished rice contains three and three-tenths per cent. more phosphoric acid anhydride than the polished.



Water Power Rice Mill in Lucban, Tayabas, P.I.

Rice Mills

Modern rice mills are gradually superseding the old-fashioned sort and are very common nowadays, especially in the rice provinces, generally along the railroad stations. There are also some water-power mills, most of which are found in Cavite, Laguna and Tayabas. At present there are several hundred small mills requiring engines of 6 or 8 horse-power to operate, which clean rice for local use. They charge, as a rule, from 20 to 50 centavos for cleaning each cavan of rice, while other mills receive only the by-products as payment for the work.

The rice grain in the hull as it is received in the mill is termed "rough rice" or "palay." The process of milling or hulling consists of three steps. In the first the hull is removed ; in the second the outer coating ; and in the third the inner one. The palay goes between a pair of grinding stones, set some distance apart, which revolve, causing the grains to assume a slanting position. While in this position pressure is exerted at the ends of the grain, which cracks or splits the hull and the kernels drop out. The mill is adjusted in such a way as to prevent too much breakage of the kernel, as broken rice sells for less. After leaving the hullers the rice is screened and fanned, to free it from the bran, broken rice or "binlid" and hull. In the United States and some other countries the kernel is polished thoroughly to give it the luster that is demanded by the market. In Spain and the United States glucose and glycerine are used for polishing.

Maritime Customs' Reports

Canton's Progress

THE construction of the first-term main roads was completed in July, and the survey for the second-term roads has been carried out and parts of these works are also well under way. Lack of funds, however, has called a temporary halt to these much-needed improvements, and the autumn troubles have further helped to impede progress. It is, however, certain that Canton means to be a modern city, and to those who have been residents there for many years the changes are very startling though very welcome. —Police records give the number of motor-cars as 94 ; and the Kwangtung Tramway Company, while awaiting fulfilment of orders for rails from America, has started its street service with six motor omnibuses.—The Kwangtung Electric Supply Company's new turbine plant has been fully installed, but the intake power-house on the river front has yet to be completed.—During the year the Canton Waterworks laid 1,533 feet of additional mains and 163,785 feet of new pipes. Income, however, only reached $15,000 for the year, and the company is reported to have lost about double that amount, owing to the increased use of fuel and the depreciation in Bank of China paper currency.—Two new match factories have been established during the year : one in Wongsha suburb, known as the 廣東火柴公司, and the other at Yimpo (鹽步), some 13 *li* from Canton, and styled the Man Sang Factory (民生火柴廠). Exports of matches extend as far as the Straits Settlements, and the substitution of locally split wood for the Japanese imported article has proved very satisfactory.—The conclusion of the great war was a hard blow to mining enterprise in Kwangtung province. A few mines have therefore closed down, and antimony ore, which gave 3,500 piculs in 1918, has fallen to 683 piculs only for 1920. The production of native coal also shows a marked shrinkage. The moderate cost of Japan coal and transport difficulties in the interior causing disproportionate expenditure, together with an advance of 100 per cent. in the importations of Kaiping coal, are the reasons assigned.—Canton has now five large factories and several hundred workshops for producing socks and underwear, the trade in which is flourishing, owing to the high price of the foreign-made article.—An innovation worthy of note as a sign of the times is the employment of female labor in other lines than as teachers and factory hands. The position of clerk in the railway administrations is one form of advancement for them, and several are employed as secretaries in the house of parliament and the senate. A further opening for girl graduates is the telephone exchange station, where plans are being made to introduce female employment.

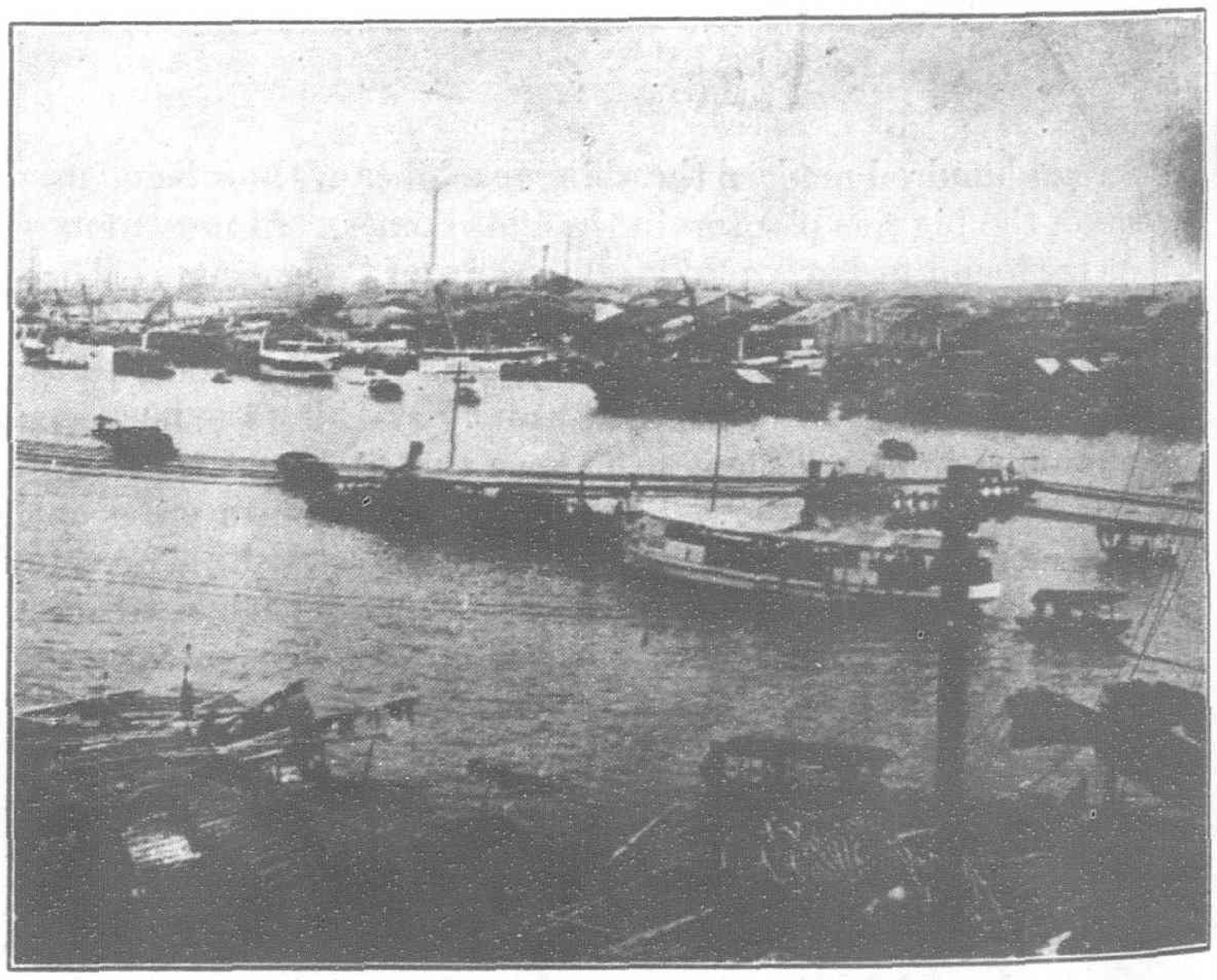
Much has been done during the year in the development of home industries. New factories have sprung up like mushrooms, and many more are in course of erection. At Honam an up-to-date cotton-yarn-spinning factory is nearing completion. Machinery of the very latest pattern is to be installed, and when completed and in full working order sufficient yarn, it is anticipated, will be produced to meet local demands and requirements. The company has been promoted locally, with a capital of five million dollars. A foundry, supplied with up-to-date machinery, for the manufacture of copper sheathing from ore mined in the province, is in full working order, with satisfactory results. Boat-building has also received an impetus by the formation of a company with modern plant. It is estimated that 100 boats of various sizes can and will be turned out in a year.

Kongmoon Activities

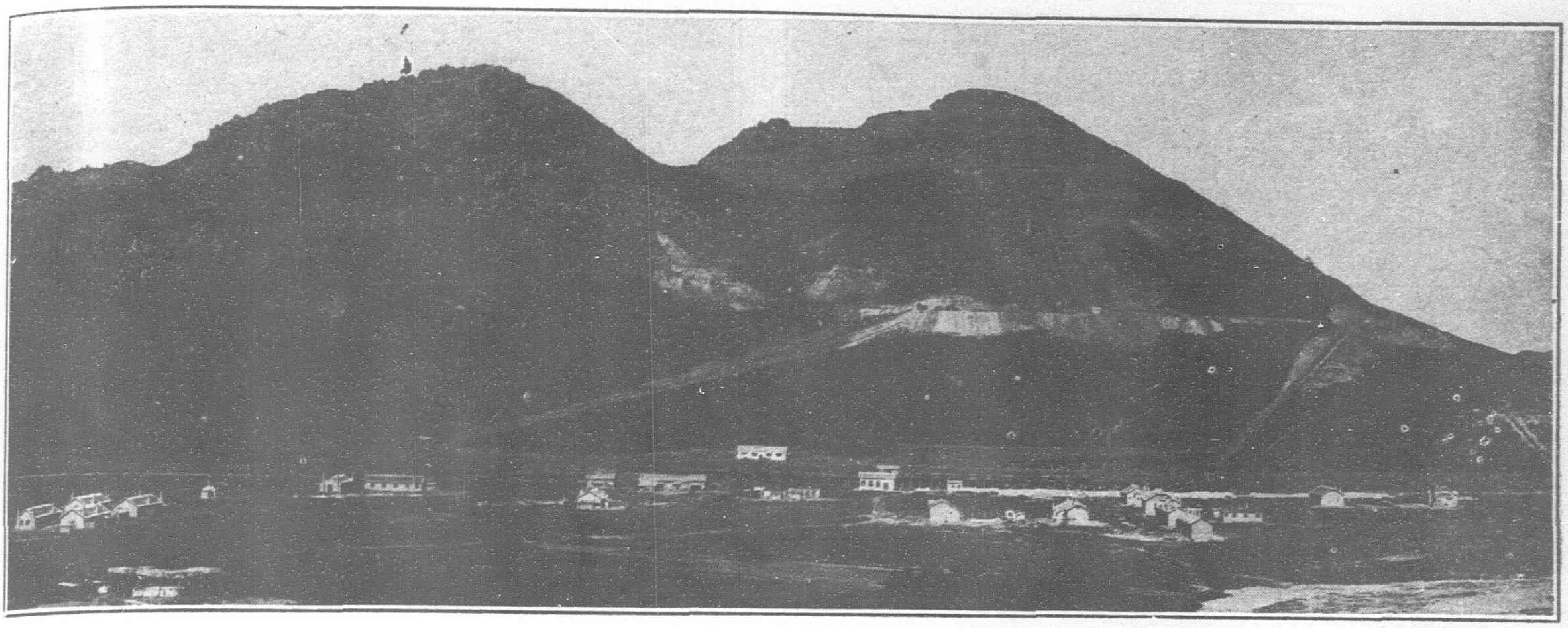
The Sunning Railway continued its operations successfully throughout the year, and the hazardous nature of transport by water is reflected in the increased number of passengers carried by this route. The rolling-stock and track, however, are in a bad state and will require a considerable outlay of capital if continued success is to be the lot of the company. A branch line was opened in November from Sunning city (新甯) to Paksha (白沙). The proposed extension to Yeungkong is still under contemplation, and it is doubtful if funds will permit of work being commenced in the near future. When completed, the company hopes to earn a large profit from the conveyance of freight as well as from the movement of passengers. Part of the capital at least for the motor road from Sunwui to Kongmoon and thence to Pakkai has been subscribed and the route roughly surveyed, while Chinese engineers have been engaged for the construction of the necessary bridgework in the section between Sunwui and Kongchow. It is anticipated that work will commence shortly.—Aeroplanes made their first appearance in the district, the Italian aviator Ferrarin, *en route* from Rome to Tokio *via* Hanoi and Canton, landing at the lonely out-station of Gaemoon (崖門) on the evening of 21st April. The machine left again the next morning, passing over Kongmoon some 15 minutes later.—The Kongmoon Paper Mill has driven a thriving trade throughout the year, and, as the only foreign-type factory in the district, its continued success must be most gratifying to its enterprising owners.

Harbor Scheme at Lappa

In January the harbor improvement scheme was taken in hand under the direction of Admiral Lacerda. The work, which is to cost some $10,000,000, embraces a breakwater to enclose a new harbor accommodating vessels drawing up to 22 feet, an inner harbor, near Green Island, for native craft and shipbuilding slips ; and spacious wharves, piers and godowns. The breakwater and seawalls are expected to be finished within three and a half years, and the whole scheme completed in eight years.



The River at Canton



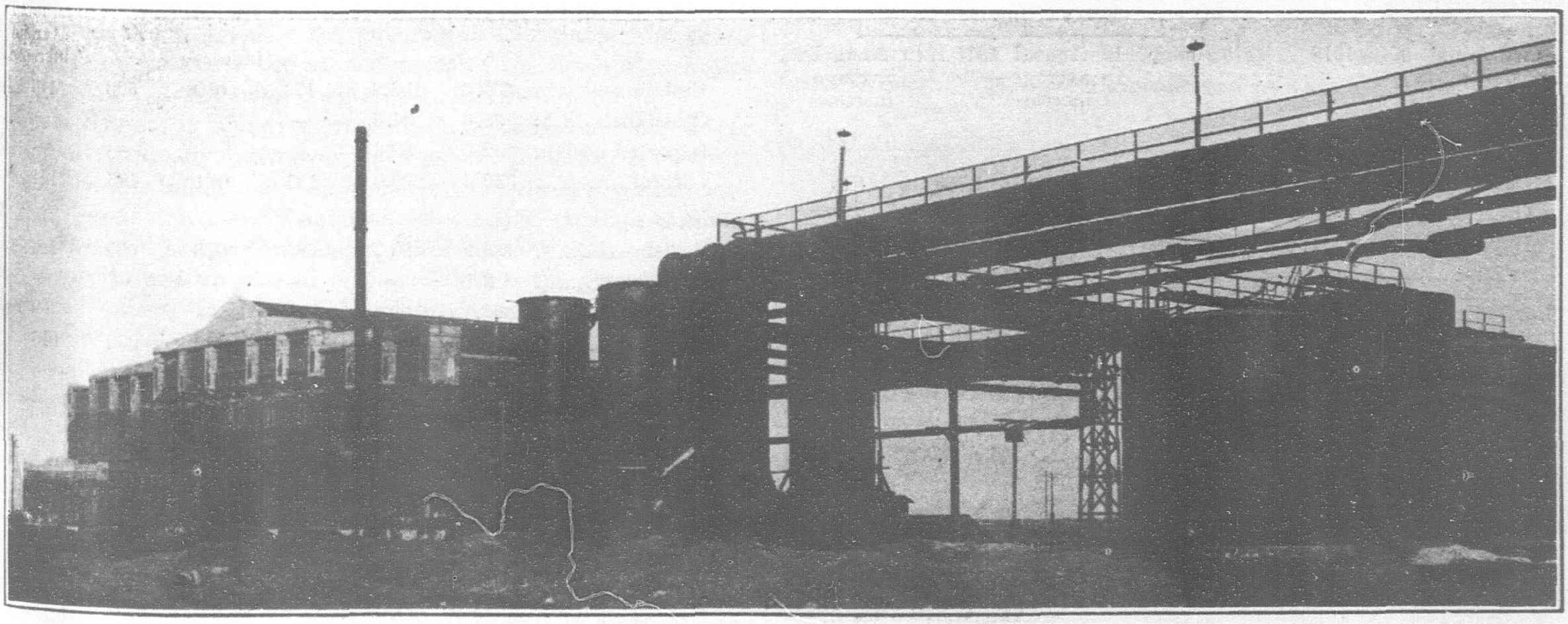
Anzan Iron Mines, The Ta Ku Shan Workings

Fushun Colliery Development

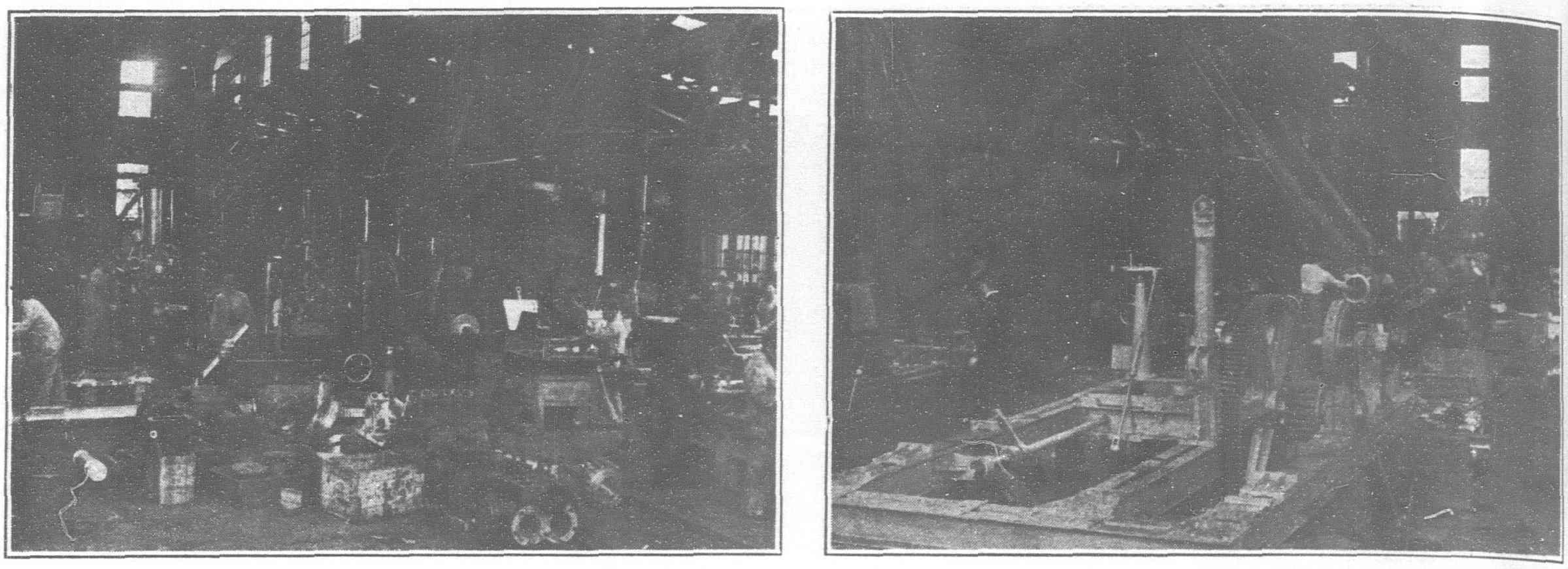
American Experts Arrive

IN order to carry out its latest ten-year program for the development of the Fushun Collieries and the Anshan Steel Works, the South Manchuria Railway Company is now engaged in carrying out most exhaustive investigations, and to this end, Viscount T. Inouye (acting general superintendent of the Fushun Mines and Anshan Steel Works) recently made a visit to the United States and there engaged the services of several prominent specialists. Amongst these are Professor W. R. Appleby, dean of the School of Mines of the University of Minnesota, Prof. W. H. Emmons, head of the department of geology and minerology of the same University, Prof. Mead, a geologist of the University of Wisconsin, Mr. Davenport, ex-chief of the mining department of the American Steel Corporation, Mr. Charge, assistant chief of the coal mining department and Mr. Hutchinson, another engineer of the same corporation. This party is to make exhaustive studies and investigations for the proper development of the low-grade Anshan iron ores, in addition to devising extensions to the Fushun coal mines and a plant for the extraction of petroleum from shale and coal. A large part of the expenditures to be made by the S.M.R. Company during the next four years, estimated at $200,000,000 gold, is to be inverted into improvements and extensions to the coal and iron mines.

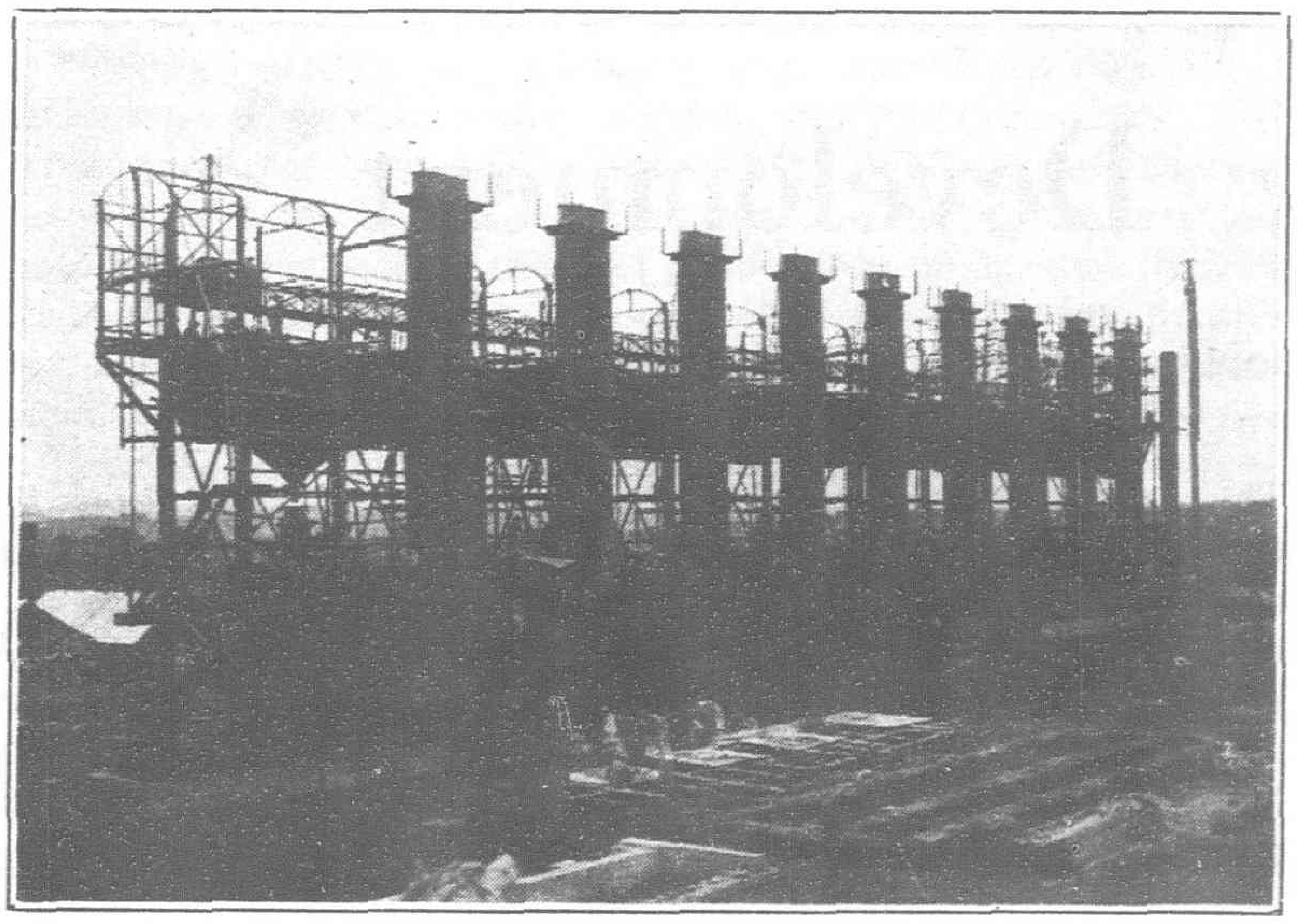
The Fushun Collieries have been often described in the pages of THE FAR EASTERN REVIEW, but we present herewith some up-to-date information on the coal and iron mines extracted from a papers by Mr. S. Otsuru and K. Wada written for the *Light of Manchuria* the official organ of the South Manchuria Railway Company.



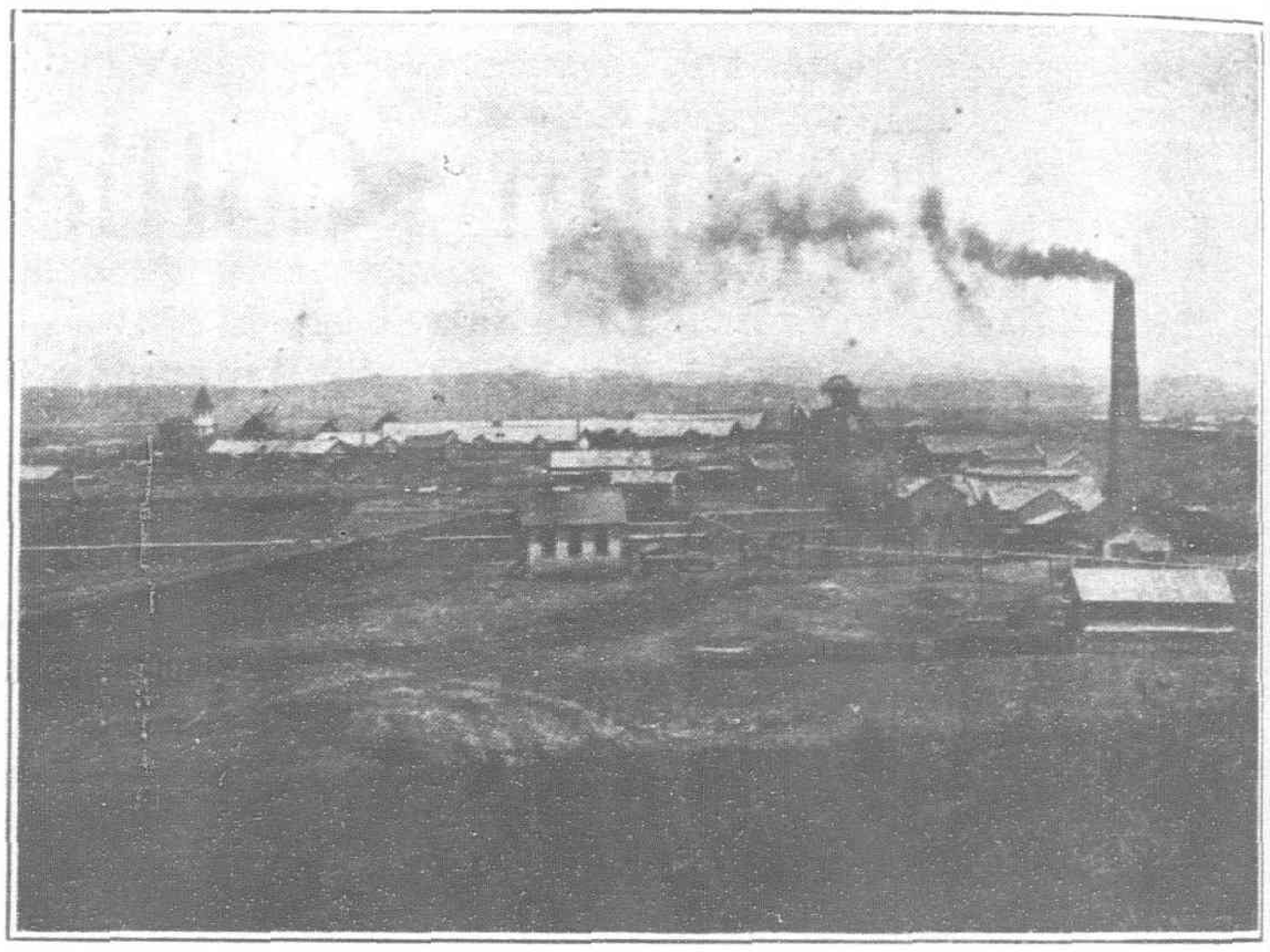
Sulphate of Ammonia Factory, Anzan, South Manchuria



INTERIOR OF MACHINE SHOPS



Gas Producers



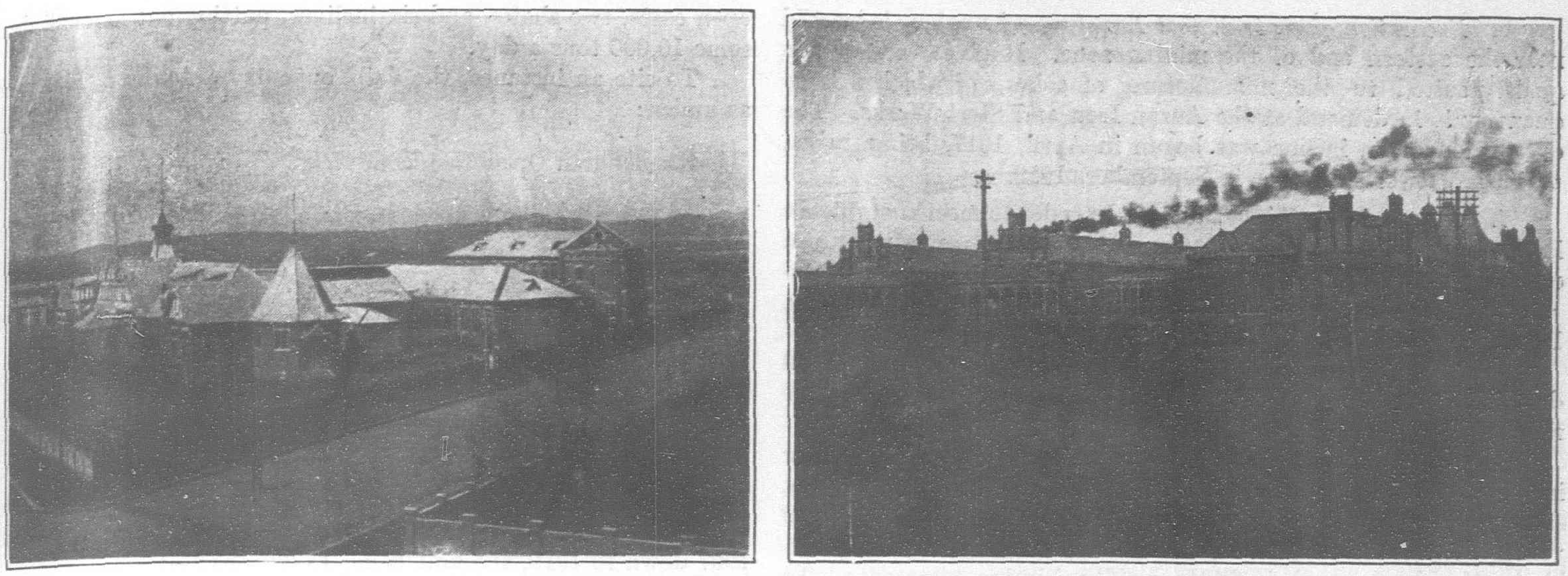
Chienchintai Pit

VIEWS OF THE SOUTH MANCHURIA RAILWAY COMPANY'S FUSHUN COLLIERIES

Unit : 1,000 tons.

Coal outputs of Manchuria	1918	1919	Rates of Increase 1908-1919	Annual average increase	1915-1919	Annual average increase
Demands:						
For use of S. M. R. Co.—						
Fushun coal	865.8	1,340.2	3,678	408	1,768	442
Other coals	158.2	111.4	—	—	—	—
Imported coals...	8.4	166.8	—	—	—	—
Total............	1,032.4	1,618.5	3,995	444	1,799	449
Local sales:						
Fushun coal	900.2	1,012.2	2,364	262	638	159
Other coals	526.3	593.1	—	—	—	—
Imported coals...	—	164.9	—	—	—	—
Total............	1,446.5	1,770.4	4,100	455	1,023	255
Exports:						
To Chosen—						
Fushun coal	397.9	156.2	1,197	133	369	092
Other coals	3.2	0.3	—	—	—	—
Imported coals...	55.9	59.8	—	—	—	—
Total............	457.2	216.3	1,480	164	140	035
To Abroad	1918	1919	Rates of Increase 1908-1919	Annual average increase	1915-1919	Annual average increase
Fushun coal	339.6	195.8	174	019	593	148
Other coals	38.8	34.6	—	—	—	—
Imported coals...	2.0	52.4	—	—	—	—
Total............	380.5	283.0	191	021	496	124
Bunkers:						
Fushun coal	135.9	83.7	685	076	505	126
Other coals	3.1	—	—	—	—	—
Imported coals...	93.1	100.4	—	—	—	—
Total............	232.3	184.2	2,550	282	062	015
Grand Total Bunkers:						
Fushun coal	2,639.6	2,788.2	1,947	216	381	095
Other coals	729.9	739.6	—	—	—	—
Imported coals...	159.6	544.6	—	—	—	—
Grand Total ...	3,529.1	4.072.5	2,882	322	653	163

Brief History.—Coal mining at Fushun dates from 600 to 700 years back when, in the Liao Chin reign, a number of Koreans came to Fushun to mine coal for the manufacture of pottery.



Fushun Collieries: School House and Hospital

Subsequently, the Moguls rose and fell. Under the Manchu dynasty, the mining work was prohibited on account of the proximity of Fushun to the tombs of the imperial ancestors. The Peking (Manchu) government, awakening to the profit of mining the coal, withdrew the ban in 1901 and gave permission to some Chinese to operate the collieries.

It was in about 1903 that the Russians, who were then in the ascendancy in North and South Manchuria began to cast longing eyes upon the Fushun Collieries. They started to invest capital in the management of the mines. In 1904, they constructed a railway and subsequently opened hostilities with Japan. On March 10, 1905, the Japanese army, which was on that day in the very thick of the successful battle of Mukden, took possession of the Fushun Collieries. The army opened a mining office and soon afterwards set about a semblance of an organized mining under the directions of the mining corps of the Japanese field railway paymasters' department.

SOUTH MANCHURIA RAILWAY COMPANY.—On April, 1907, on which date the South Manchuria Railway Company took over management of the railways ceded to Japan by Russia, which have been styled the South Manchuria Railway Lines, the Railway Company also assumed management of the collieries at Fushun, Yentai and Chatzuyao, and in July of the same year, the two minor collieries at Taochiatun and Shihpeiling were taken over also from Russia in terms of the Russo-Japanese Railway Agreement.

Of the above-mentioned collieries, both Fushun and Yentai have lain under management of the South Manchuria Railway Company and the Chatzuyao colliery (in fact an insignificant ore) of a private Japanese; whilst the collieries at Taochiatun and Shihpeiling were entrusted to the management of the Souh Manchuria Mining Co., Ltd., a Japanese corporation, in 1918.

FIRST STAGE OF FUSHUN MINING PLAN.—At the time when the Railway Company took over the Fushun Collieries, they were worked only on a small scale, and between the three pits at Chienchinchai, Yangpaipu and Laohutai, the daily outputs totaled only 360 tons. When the late Dr. B. Matsuda took up his duties as the first superintendent general of the collieries, the energetic and experienced expert drafted what is known as the plan for the first stage of Fushun coal mining estimated to cost Y.9,200,000. The same plan had as one of its prominent features the excavation of two extensive shafts at Chienchinchai and Yangpaipu. The two shafts were completed in 1911 and were respectively named Oyama and Togo pits. Sundry improvements were introduced in other directions, and the daily outputs were raised to 5,000 tons.

SECOND STAGE OF FUSHUN MINING PLAN.—The second stage of Fushun mining plan was entered upon. On the death of Dr. Matsuda (the successful organizer and first manager of the collieries) in 1911, Dr. S. Yonekura succeeded the deceased in July of the same year.

The chief items of enterprises carried out during this stage were as follow:

1. Completion of excavation of an incline at Wantawu (commenced in April, 1914, and opened to operation in April, 1915).

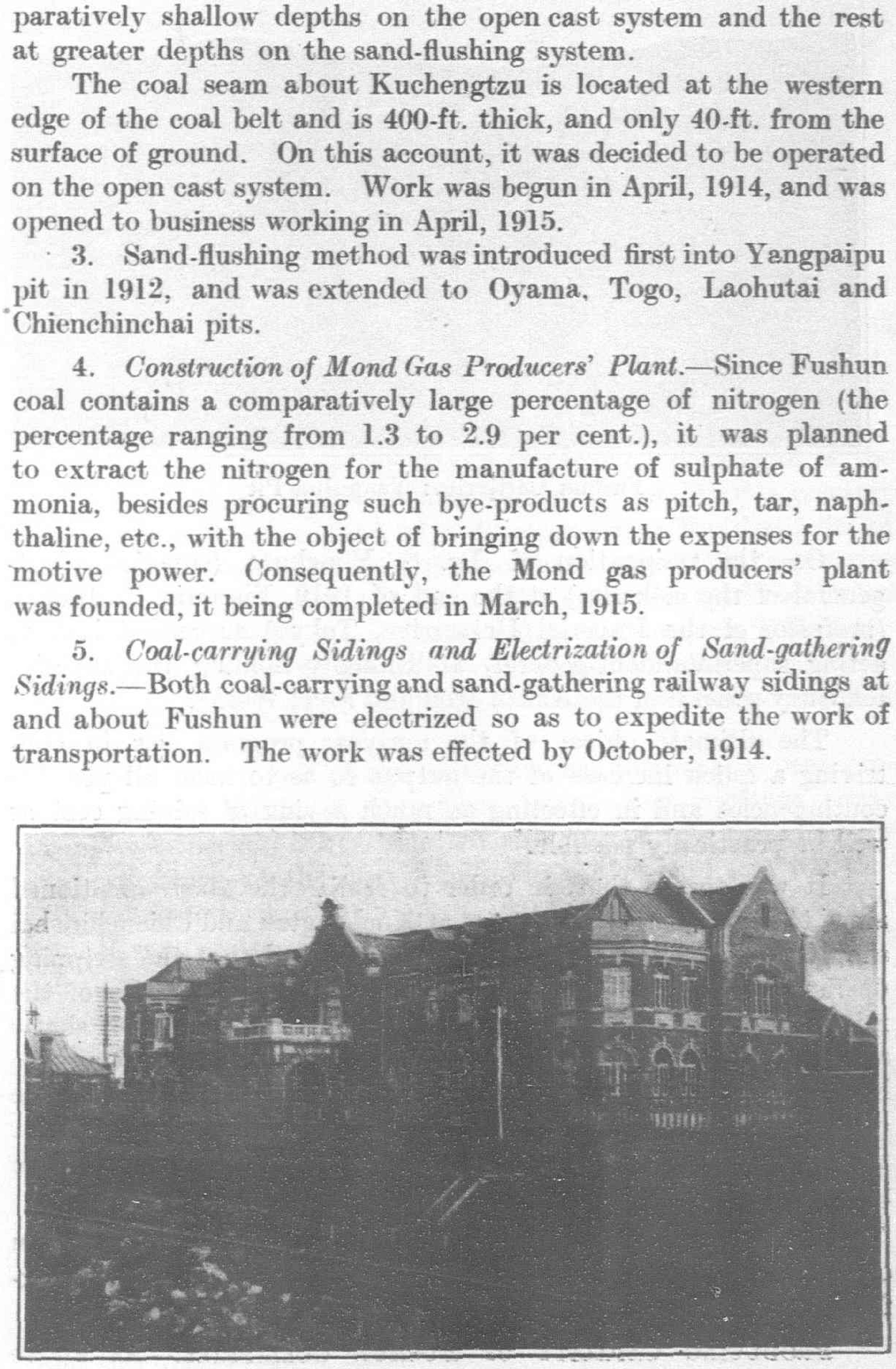
2. *Open Cast at Kuchengtzu.*—As already mentioned, owing to the unparalleled thickness of the Fushun coal seam, the most commendable plan of mining is to work the portion at comparatively shallow depths on the open cast system and the rest at greater depths on the sand-flushing system.

The coal seam about Kuchengtzu is located at the western edge of the coal belt and is 400-ft. thick, and only 40-ft. from the surface of ground. On this account, it was decided to be operated on the open cast system. Work was begun in April, 1914, and was opened to business working in April, 1915.

3. Sand-flushing method was introduced first into Yangpaipu pit in 1912, and was extended to Oyama, Togo, Laohutai and Chienchinchai pits.

4. *Construction of Mond Gas Producers' Plant.*—Since Fushun coal contains a comparatively large percentage of nitrogen (the percentage ranging from 1.3 to 2.9 per cent.), it was planned to extract the nitrogen for the manufacture of sulphate of ammonia, besides procuring such bye-products as pitch, tar, naphthaline, etc., with the object of bringing down the expenses for the motive power. Consequently, the Mond gas producers' plant was founded, it being completed in March, 1915.

5. *Coal-carrying Sidings and Electrization of Sand-gathering Sidings.*—Both coal-carrying and sand-gathering railway sidings at and about Fushun were electrized so as to expedite the work of transportation. The work was effected by October, 1914.



Head Office of the Fushun Colliery

6. *Excavation of an Incline at Lungfeng.*—Lungfeng is located near the eastern end of the mining zone. It gives coal of fine quality suited to the manufacture of cokes, of which a large quantity is in demand at the Anzan Iron and Steel Works. The excavation of an incline was begun in April, 1917, being raised to business working order in September, 1919.

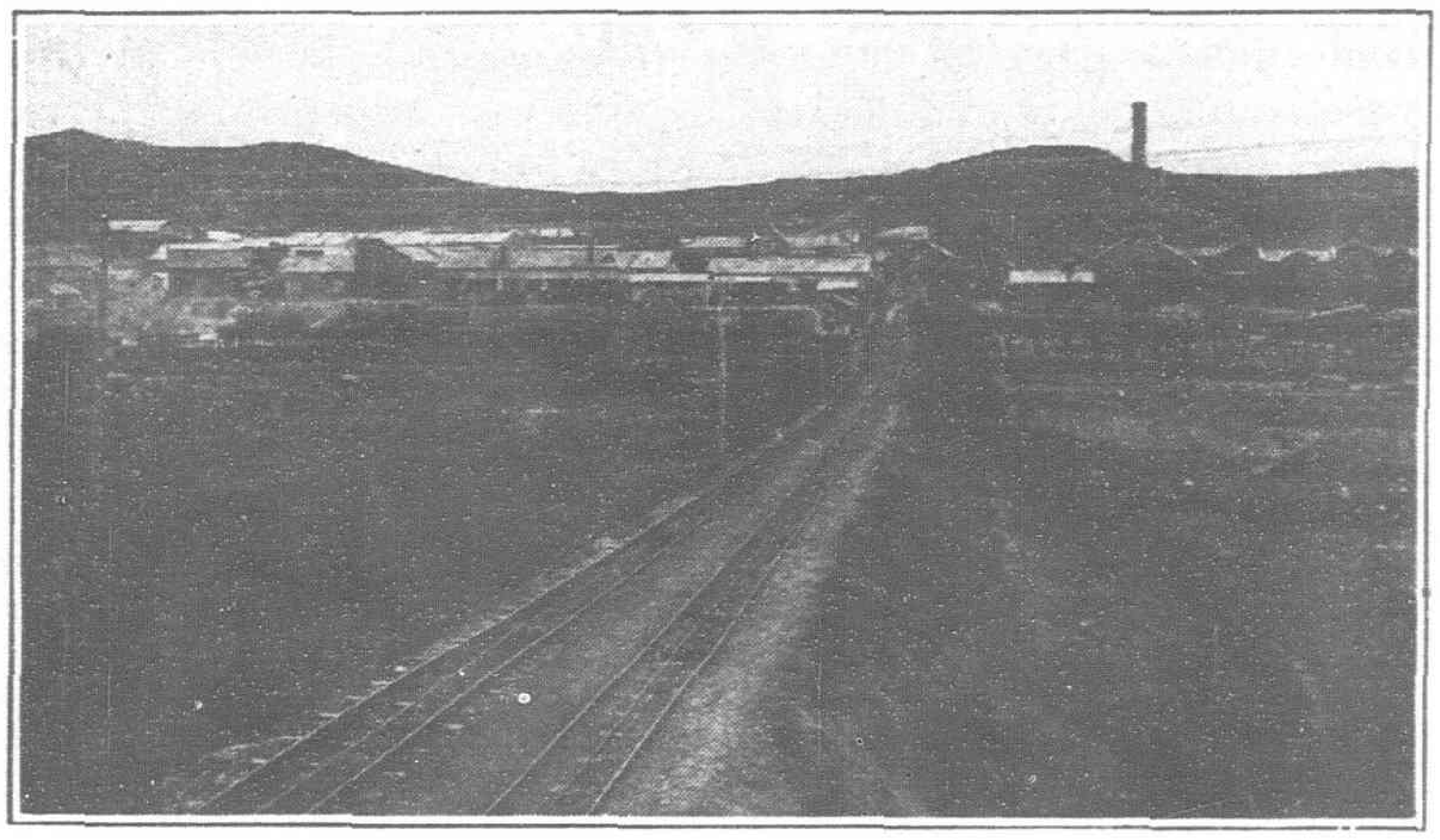
7. *Open Cast at Chienchinchai.*—In order to meet the quickly increasing demand in consequence of the great war, a new open cast was initiated at the west of the Chienchinchai pit.

8. The excavation of another incline was started in May, 1918. It was opened to business working in April, 1920.

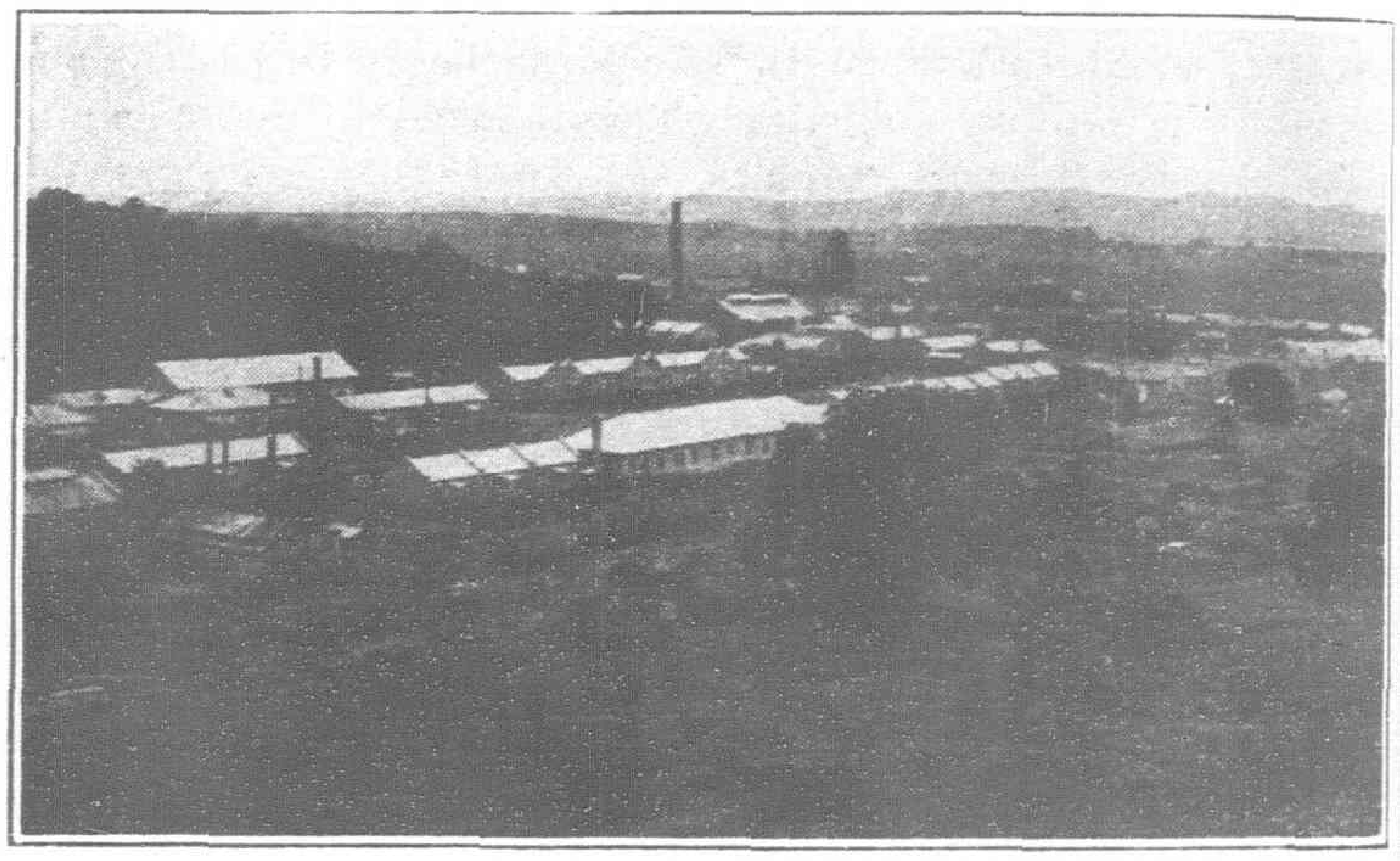
Through the introduction of all these enterprises, the total daily outputs were increased to about 7,000 tons a day by the fiscal year 1918.

THIRD STAGE OF FUSHUN MINING PLAN.—The great war inflated also the economic activities in Manchuria and Chosen, substantially increasing the population. Many fresh industrial ventures were launched afresh in these regions, making it impossible for Manchurian coals to fill the rapidly rising requirements. To make up for the shortage, it was necessary to import 150,000 tons of coal in the fiscal year 1918 and 490,000 tons in the following fiscal year, 1919.

The possible increase of demand in Manchuria and Chosen, particularly by the Anzan Iron and Steel Works, had to be considered, and under these circumstances, what is designated as the ten-year program was drawn up in 1919.



Fushun Collieries: Yanpuipu Pit



Lanhutai Pit

On the resignation of Dr. S. Yonekura (superintendent-general of the collieries) at the end of 1919, Viscount T. Inouye (professor of the Imperial University, Tokyo) succeeded him as acting superintendent-general, additionally holding the superintendency-general of the Anzan Iron and Steel Works.

The ultimate object of the ten-year program lies in contriving a quick increase of the output so as to meet all possible contingencies and in effecting as much saving of mining cost as well be practically possible.

It was agreed that, in order to realize the above-mentioned aims, the two existing open casts at Kuchengtzu and Chienchinchai should be connected and operated as one, and that the stripping operation should be extended further to the present site of the railway town of Chienchinchai, that three new extensive shafts should be excavated, so that by 1929 the annual outputs may be increased to 8,000,000 tons (inclusive of 3,400,000 tons from the open cast, which will be 46 per cent. of the total yield), and that twenty years hence, that is, by 1939, the annual total may be increased to 11,000,000 tons.

The first steps taken in the above direction are the extension of the Chienchinchai open cast and the excavation of the Lungfeng pit.

PRODUCING CAPACITY OF FUSHUN COLLIERIES.—As above stated, the Fushun Collieries are being operated by means of two open casts, two shafts, and six inclines, putting out amongst them some 10,000 tons a day.

To cite an instance, the daily outputs on April 14, 1920, were as under:

		Tons
Kuchengtzu Open Cast Zone ...	Kuchengtzu ...	1,638
	Chinchinchai ...	1,179
Oyama Mining Zone	Chienchinchai...	1,519
	Oyama ...	2,033
Togo Mining Zone	Togo	999
	Yangpaipu ...	1,693
Laohutai Mining Zone ...	Laohutai ...	1,344
	Wantawu ...	684
Lungfeng Mining Zone ...	Lungfeng ...	516
	Hsintun ...	135
	Total... ...	11,742

The following gives the annual outputs of the different pits from 1907 down to 1919, the unit being 1,000 tons :—

	Open Cast No. 1	Open Cast No. 2	Chienchin-chai	Oyama	Togo
1907... ...	—	—	103.3	—	—
1908... ...	—	—	238.8	—	—
1909... ...	—	—	324.1	0.1	—
1910... ...	—	—	370.4	14.4	17.4
1911... ...	—	—	404.9	186.4	146.6
1912... ...	—	—	384.8	359.9	252.0
1913... ...	—	—	579.5	421.1	414.9
1914... ...	2.1	—	683.6	235.0	472.2
1915... ...	102.7	—	623.1	301.6	430.4
1916... ...	173.5	—	572.3	305.2	170.8
1917... ...	272.3	0.2	602.7	135.7	291.4
1918... ...	260.7	66.8	486.0	328.2	319.5
1919... ...	231.3	300.4	307.6	406.4	319.5

	Yangpaipu	Laohutai	Wantawu	Hsiutun	Lungfeng	Total
1907... ...	64.5	65.5	—	—	—	233.3
1908... ...	127.3	124.6	—	—	—	490.7
1909... ...	176.1	192.7	—	—	—	693.2
1910... ...	217.8	279.0	—	—	—	899.2
1911... ...	301.6	285.0	—	—	—	1,324.5
1912... ...	219.2	261.5	—	—	—	1,471.1
1913... ...	290.7	473.0	—	—	—	2,179.2
1914... ...	381.8	420.1	—	—	—	2,149.8
1915... ...	471.8	179.4	53.4	—	—	2,162.6
1916... ...	499.1	257.8	65.6	—	—	2,044.4
1917... ...	598.0	295.5	110.7	—	5.1	2,311.4
1918... ...	501.5	393.7	157.0	—	74.5	2,521.2
1919... ...	454.7	405.0	164.7	18.1	155.2	2,762.7
Grand total...	...	...	...	...	... ...	21,242.3

Location Topography, and Geology of Fushun Collieries.—Fushun Collieries are located at about 23 miles east of Mukden, and Chienchinchai in the western part of the Fushun coal belt is situate at 33 miles northeast of Sushiatun junction at which the branch line to Fushun Collieries deviates from the main line of the South Manchuria Railway Lines. At Chienchichai, the colliery town is located. More correctly speaking, the central location post in front of the general offices of the Fushun Collieries stands at 41° 58′ N.L. and 124° 6′ E.L. and above 276-ft. above the sea-level. It is 266 miles distant to Dairen, 193 miles to Antung, and 202 miles to Yingkou (Newchwang).

Colliery Town of Fushun.—Dr. S. Yoshino (professor of the Imperial University, Tokyo) is said to have once remarked that the Fushun colliery town is a miniature of the town of Jena. Since it is the colliery town, the colliery offices and the residences of the Company's officials and employees, together with the primary school, the colliery hospital, the colliery club, the assembly hall, the colliery library, etc., make up the principal buildings. In recent years, stores and shops of different kinds have been opened, but not a street is remarkable for dense traffic. Each street has a vehicular road with a sidewalk on each side lined with shade trees such as acacias, poplars, elms, etc.

In early summer, when these shade trees wear a verdant foliage, through which glimpses of red brick buildings may be caught, and the sweet scent of the white acacia flowers fills the streets, even the crude colliery town lends itself some charming air which may appeal to visitors.

The River Hun has its head among the mountains near Hsingking situated to the east of Fushun. For some fifty miles or so, it gathers petty tributaries and run down the narrow defiles and gorges. The valley considerably gains in size rather abruptly near Tachiapang situated about ten miles east of Chienchinchai. At that point it is about three and a half miles in width, still further expanding as it goes west, connecting with the great plain about Mukden.

Fushun Mining Zone.—The Fushun mining zones lie in this valley, stretching from east to west on the south bank of the Hun River. On the east of the mining zone runs the Tungchou River, a tributary of the Hun, and on the west the Kuchengtzu, another tributary of the Hun. The mining zone is about ten miles from east to west and about two miles from north to south.

From the top of Senkindai (an eminence rising on the south of the colliery town) one may command a fine view of the Hun Valley. In the east, a range of hills is seen undulating and zigzagging. This range of hills marks the southern boundary of the Fushun mining zone. Near Laohutai in the centre of the mining zone, the same range sharply takes a northern direction. This geological feature was caused by the extensive fault running from north to south. This same range may be likened to a pillow for the great coal seam. These hills are constituted of basalt wholly, and on the north side, facing the Hun River, the coal seam has the uniform dip of about 30°.

The enormous coal hoard estimated at 1,000,000,000 tons lay quiet and unnoticed on the bed of basalt, covered with layers of rocky formations. Thus the hoard had lain dormant for billions of years, until the outcrops showing above ground at several points betrayed at length the existence of the subterranean wealth and led to human exploitation. The geological structure of Fushun and environs is composed of hornblende gneiss, which bears a resemblance to both ignious rock and sedimentaryrock, is supposed to have been formed on the "second day of the creation." In the tertiary period of the Cainozoic Era, such layers as those of tuff, sandstone, conglomerate, and shale are supposed to have been brought into existence, and the district is supposed to have been turned into a lake. The lower structure has a couple of thin coal layers running one over the other through it. These layers are called the lower coal-bearing series, the upper 20-ft. thick and the lower only 2-ft. thick, being from several feet to dozens of feet apart. There are traces of the upper layer having been mined from olden times, and such minor mines as Piaoerh Colliery, Hsiaopiao Colliery, Huasheng Colliery, and a few others are being worked upon this layer. The geological layers were organized one after another in the above-mentioned order, completing the earth's crust. Animal life became propagated steadily. The mammals, in particular, were developed wonderfully. In the mean time, the volcanoes were active, and about Fushun, too, there occurred volcanic eruptions, pouring out lava and turning the country into a veritable hell. It was this lava that became basalt, which overlaps the lower coal measures. Again, pozzuolana settled down into tuff.

These layers were overlapped in turn by others of shale and sandstone, and then in the course of millions of years, the herbage, driftwood, fallen trees, etc., were heaped and buried under ground. Under the high pressure and strong heat, they became completely carbonized, thus the principal coal layers of the Fushun coal seam, which has no parallel in the world in point of thickness, came to be formed.

Fushun Coal Layers.—The Fushun coal seam is 78-ft. thick near Lungfeng pit, inclusive of 31-ft. of parting, where it is the thinnest, while directly underneath the colliery town of Chienchinchai, where the seam is the thickest, it is 426-ft. in thickness, inclusive of 19-ft. of parting. The mean thickness of 150-ft. (inclusive of 20-ft. of parting) is found at Laohutai. The contrast with the coal seams in Great Britain, the United States and Germany, which range from only 2 to 10-ft. in thickness, is indeed striking.

Oil Shale.—Over the coal seam, a layer of shale of brownish color, about 300-ft. thick, was formed, and this is in turn overlapped with a still another layer of shale of greenish color and of remarkable thickness (measuring 450-ft. on an average in thickness). It is this oil shale that has acquired much importance as material for extracting crude petroleum from, for instance, in the United States owing to the short supply of kerosene in recent years.

The oil shale at Fushun has only a meagre percentage of crude petroleum. However, in case of the gigantic stripping plan being carried out according to the present scheme, an immense quantity of the oil shale will have to be excavated and removed, and it furnishes a problem for settlement, in order to obtain petroleum therefrom.

Faults—The organization of the earth's crust progressed in good order as mentioned above, and finally a noteworthy accident happened. As a result of the contraction of the earth's crust, in the centre of the great coal field, a crack or fault of considerable dimensions was created from east to west.

Presumably through the strong pressure on both sides of the coal seam, its central part became pushed up, and it was possibly from some weakness caused by a development in the due order of the geological structure, that the northern part of the seam was pushed up abruptly, whilst in the south the seam dipped northward at about 27°. There was perhaps coal in the northern half of the seam, but now only the lowest layer of gneiss is exposed, and there is no trace of coal, which might have been either washed away or have eroded.

The southern half of the coal seam has fortunately been protected. Since basalt, in its nature, has a great resistant power against weathering, it has been left as a line of hills bounding the southern fringe of the coal field. The coal seam itself, together with the shale layer, is overlapped by the diluvium formed by the Hun River, in the quaternary period, which consists of clay and alluvium being from 30 to 80-ft. in thickness.

Magnitude of Coal Hoard.—The approximate dimensions of the Fushun coal seam have been ascertained by technical estimation, according to which the scum extends from east to west beyond the limits of the Fushun colliery zone, whilst on the south it starts from the foot of the basalt hill and extends in width from 1 mile to 1½ miles. None is found to exist on the bank of the Hun other than above mentioned. The coal hoard in this zone is estimated at about 1,000,000,000 tons.

Quality of Fushun Coal—Fushun coal is practically uniform in quality. As it proceeds eastward up to Lungfeng pit from the west of Kuchengtzu and Chienchinchai, the coal is found to gain in coke, nitrogen and ash, whilst it loses in volatile matter; Near Chienchinchai, an extremely hard coal, often called "Kabari," is met with in parts of the seam. "Kabari" is used as material for carving, and figures of popular fairy saints, flower-pots, etc., are carved in the lustrous jet-black coal and are on sale, commanding a pretty brisk demand as souvenirs to visitors to the colliery, Orientals and Westerners. In some parts of the seam, the coal contains much amber, and the Chinese handicraftsmen turn out medicine cases, seal-cases, and like knick-knacks. This particular kind of coal is known to have been carbonized from coniferae. Occasionally, small pieces of pirite are noted to be fastened to the cleaven part of coal. About Kuchengtzu, siderite is mined and makes a material for iron manufacture.

Result of Latest Analysis :—The result of the latest analysis of Fushun Coal is as follows :—

	Water	Volatile matter	Fixed carbon	Characteristic of coke	Ash	Colour of ash
Maximum	3.25	43.01	51.89	Slightly expansive Caking	18.5	Yellowish
Minimum	5.84	33.96	42.90	Caking	17.30	Greyish

	Sulphur	Nitrogen	Calorific power
Maximum	0.81	1.38	7.750
Minimum	0.46	1.21	6.170

From the above table, it may be seen that the comparatively larger percentage of water is a drawback of Fushun coal, which lowers the calorific efficiency compared with the weight. It also interferes a little with the combustion of dust coal which has become quite a popular usage lately. However, the latter difficulty may be surmounted by means of the drying appliances. Next, Fushun coal was considered as falling short of caking property, which renders it unsuited to the manufacture of coke for the smelting furnace of a steel works. Luckily, a coal possessed of a good amount of caking property has been found to occur in the eastern part of the coal seam, and this coal has proved very acceptable. It was for this reason that the two pits of Lungfeng and Hsintun were excavated recently in order to supply coke to the Anzan Iron and Steel Works.

Another characteristic of Fushun coal is that it is rich in volatile matter. This facilitates combustion and adapts Fushun coal to various uses. In particular, as a gas producing coal, Fushun coal takes the first place among its likes in all the Orient.

Again, the fact that Fushun coal contains an unusually large amount of nitrogen suggested the profitability of recovering ammonia by establishing a Mond gas-producer plant. During the great war, the Fushun collieries management could operate twenty generating furnaces on the Mond system and fourteen others on the Limm system so as to put out sulphate of ammonia in a large quantity as a bye-product, while generating electric power.

Last but not least, Fushun coal has still another advantage in that the ash percentage is comparatively low. The percentage seldom goes above 4 or 5 per cent.

It may be counted as still another advantage that the clinkers stick to the grate of the boiler but little, necessitating very small trouble in cleaning the boiler. Then, the contents of sulphur which does most harm to the boiler are extremely small.

Coal is classified according to the percentages of fixed carbon, water, volatile matter, calorific power, etc., into anthracite, semi-anthracite, bituminous coal and lignite of different degrees.

Fushun coal may be placed between bituminous coal of medium and low degrees.

Japanese Match Industry

There is considerable speculation as to the effect which the bill recently passed by the Japanese diet, prohibiting the use of yellow phosphorus in the manufacture of matches, will have on the match trade of Japan, says Reuter's Trade Service. Many manufacturers have foreseen the likelihood of such a bill being passed, and have taken steps to offset any damaging effect it might have on their business by experimenting with other chemicals. Many of the manufacturers have discontinued manufacturing yellow phosphorus matches altogether. There are, however, eight factories in Hyogo prefecture still using yellow phosphorus. Their production has decreased during the past year, partly owing to the prospect of such legislation, and partly on account of the economic depression. In 1919 the output of matches in Japan amounted to 2,436,900 gross boxes, valued at Y. 1,492,418. The output of 1920 was only 755,900 gross boxes, valued at Y. 472,312. Some manufacturers have huge stocks of boxes and labels used exclusively for yellow phosphorus matches, and do not know how to dispose of them before the prohibition becomes effective in a year's time. Unless there is a marked revival in demand these manufacturers stand to lose heavily.

American Aid to China's Tanning Industry

AMONG the new departments the Peking University is about to introduce into its curriculum will be a course in tannery under the instruction of Dr. H. S. Vincent and John Wang. The following is an extract from the announcement issued by the university :—

"In 1918 China exported $24,000,000 worth of raw hides and imported $15,000,000 worth of leather. There are but four tanneries in China rated as such by the Chinese government and these are relatively small. Such facts constitute a challenge to provide a means of contact for the students of China that they may grasp the economic problems and opportunities of the country. Leather being a basic industry, is being undertaken first, but if this effort is received and supported by the Chinese other branches of manufacturing arts will be offered as may be indicated.

"Twelve hours each week must be spent in the practice laboratory, each student acquiring a proficiency in the various processes of tanning. This practice laboratory is being provided with a complete equipment of modern leather working machinery from America and stocked with the necessary chemicals and dyes and the latest improved tanning compounds.

"For this leather department Peking University has secured two practical tanners who are college-bred men and have had experience in teaching the art of tanning, Dr. H. S. Vincent, the head of the department of leather manufacture, has been seventeen years a missionary in Siam. He instituted and successfully operated a school of leather manufacture in Siam. Dr. Vincent will be assisted by John Wang, who has proved his technical knowledge and practical skill in establishing the Hwa Pei Tannery in Tientsin. Added assurance of success consists in the co-operation of an American firm which stands foremost in the production of leather tanning compounds and whose service men are of international reputation. This firm will send their service men to China from time to time that they may render expert aid to the Peking University leather manufacturing department and to its students and graduates who may be operating tanneries."

Board Enlargement of English Shipbuilding Co.

The board of John I. Thornycroft & Co., Ltd., has recently been enlarged by the election of technical directors, and the secretary of the company, and now consits of Sir John E. Thornycroft (managing director), Mr. S. W. Barnaby, Sir Edwin Grant Burls, Mr. T. Donaldson, Mr. Alex. Glegg, J.P., Mr. J. Maughfling, Mr. John Smith, and Mr. T. Thornycroft. The founder of the firm, Sir John I. Thornycroft, continues his association with the company as advisory engineer and naval architect.

Industrial Development in China

Views of the Chinese Maritime Customs

IN the report on the "Foreign Trade of China," compiled by the maritime customs, Mr. J. W. H. Ferguson, their statistical secretary, says:

Metals and Minerals.—It is very satisfactory to be able to note that the export of metals and minerals made greater strides in 1920 than during the previous year, although, considering the vast resources at the disposal of the country which are only awaiting development, the quantities are still infinitesimal. All the items in this group, with the exception of copper ingots and slabs, quicksilver, tin compound, and zinc (spelter), registered considerable increases. Among the most notable are antimony (regulus, crude and ore), which fell off in 1919 but has now fully recovered, increasing from 147,541 piculs in 1919 to 258,504 piculs; lead and lead ore, which made a remarkable advance from 2,448 piculs in 1919 to 44,989 piculs, and iron ore, the exportation of which amounted to 11,292,407 piculs, as against 10,589,375 piculs in 1919. The export of ores not separately enumerated in the customs returns amounted in 1920 to 507,856 piculs, valued at Hk. Tls. 1,564,653, and comprised bismuth, 1,496 piculs; copper, 3,410 piculs; manganese, 418,725 piculs; molybdenum, 271 piculs; wolfram, 69,273 piculs; and asbestos, 86 piculs.

Machinery.—This heading deserves the notice of all those interested in the future of China, since by the increase in the importation figures of the articles grouped under it may be gauged the progress made by the country on the road of industrial development. The demand for all kinds of machinery, machine tools, and engineering goods is steadily growing, and inquiries are more and more received from remote places in the interior. Machinery of all kinds imported in 1913 was valued at 46 million taels, which increased to 14.1 millions in 1919 and 22.3 millions in 1920.

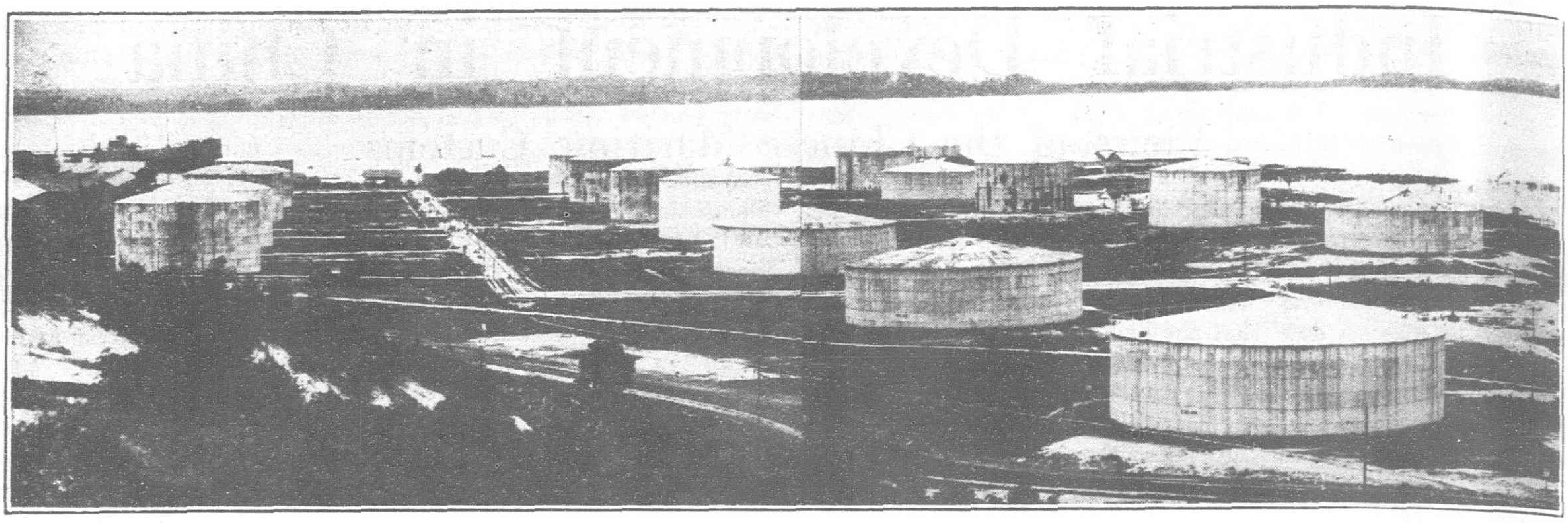
Electrical Materials is another interesting and suggestive heading. A marked development in the use of electrical machinery occurred during 1920. The demand for electric lighting in most cities altogether exceeded the supply, and existing plants were heavily overloaded, with the result that influential merchants and shopkeepers in the various cities purchased small electric lighting sets for the lighting of their own shops and perhaps two or three adjacent premises. These small sets were supplied almost entirely from America. There is a tendency in the more important establishments to install larger units, and while a few years ago 200 and 400 kilowatts were considered large, it is now quite common to install units of 1,000 kilowatts and upwards, and it is reported that a large number of orders has been placed for privately-owned power-stations for the purpose of supplying power to cotton and flour mills. This increase in the amount of machinery installed has of course stimulated the demand for electrical accessories, fittings and lamps. Japan has captured the lion's share of the business in accessories, especially in the cheaper kinds; America has the largest share of the better-class fittings and glassware, while in lamps the market is practically monopolised by the large factories in Shanghai and by Dutch and Japanese manufacturers. The importation of electrical materials into China amounted to 2.3 million taels in 1913, 5 millions in 1919 and 6.3 millions in 1920.

After reviewing adverse business condition Mr. Ferguson continues: Nevertheless, viewed from a wider outlook, there are many bright spots discernible. The present is a transition period unavoidable after the economic upheaval caused by the great war, and must end sooner or later, when conditions again approach their normal level. Furthermore, the potentialities of the industrial and commercial development of China, with its vast resources as yet scarcely touched, and with its teeming population, hardworking and industrious as nowhere else in the world, are such that confidence in the country's future would appear to be fully justified. Already foreign goods are being absorbed by the people in steadily increasing quantities. Factories modelled and managed on foreign lines are springing up in every suitable locality. At the end of 1920 there were more than 400 of these factories producing articles of foreign type and enjoying special customs treatment. 48 of these manufacture soap, 31 candles, 29 cotton yarn, 26 flour, 25 cotton socks, 24 cotton piece goods, 20 miscellaneous cotton goods, 17 paper, 15 cigarettes and tobacco, 10 slate pencils, 7 biscuits, and so on down a long list containing a most varied assortment of household and other articles in daily use. Many other signs of progress are noticeable. The University of Nanking, through its department of sericulture, is endeavoring by scientific study to improve the silk industry of China, while the government authorised the formation at Chefoo of an international committee for the improvement of Shantung silk. The international committee for the improvement of sericulture in China, situated at Shanghai, is doing good work; and a similar committee, having the same purpose in view, was recently established at Canton. As the staple articles of export from China are of a bulky nature and have often to be conveyed over long distances from the interior, it is gratifying to notice that the improvement of transportation and the construction of roads is increasingly engaging the attention of the provincial authorities. Motor-boats are also coming into favor on inland waterways, and motor-cars are now encountered wherever the roads lend themselves to this traffic. Shipbuilding in China is becoming a flourishing industry, with a promising future, and is likely before long to be counted among the great assets of the country along with its coal, iron and steel industries. Railway construction has not advanced much in recent years, no doubt owing to difficulties caused by the war and the high silver exchange; but as the need for railway communication throughout the country is obvious, it is expected that extension of the existing lines and construction of new ones will be resumed without delay. Harbor and river conservancy is not neglected, and there are several works is progress improving conditions in this connection. The lighting of the coast of China and the establishment and maintenance of the necessary aids to navigation is constantly being improved and added to.

Foreign Firms in China

The government bureau of economic information quotes the following figures regarding foreign firms in China from the journal of the high industrial commissioner:—

	Firms.	Personnel.
U. S. A.	413	6,660
Belgium	20	391
Denmark	27	546
Austria	5	27
Great Britain	644	13,234
Netherlands	25	367
France	171	4,409
Germany	2	1,235
Italy	19	376
Japan	4,878	171,485
Norway	12	249
Portugal	93	2,390
Russia...	1,780	148,170
Spain	8	272
Switzerland	4	632
Others, unclassified	33	537



PANORAMIC VIEW OF THE STORAGE TANKS OF THE ROYAL

Petroleum in the N. E. I.

THE development of the petroleum industry in the Dutch East-Indies is of comparatively recent date. The first concession was granted in 1883 in Lankat (North Sumatra) and has since been followed by several more.

At the end of 1918 the number of concessions granted and sanctioned by the Dutch East Indian government amounted to respectively 61 and 26, of the latter 15 especially for petroleum and other bituminous substances.

The chief centres of production are located in the provinces :

South and East Division of Borneo : Palembang : Acheen and dependencies : East coast of Sumatra : Rembang : Sourabaya : Amboina (the island of Ceram).

The products obtained from the crude oil are, among others : benzine, kerosene, residue or liquid fuel, lubricating oil, asphalt, paraffin wax, from which candles and battik wax are also manufactured. The oil from the various districts differs in appearance and composition, so that it can be worked into a large variety of products.

The Sumatra oil, for instance, produces benzine, kerosene and lubricating oil, while the heavier Borneo oil yields kerosene, oil fuel and paraffin wax. Benzine is put on the market in two grades : light and heavy. That obtained from Sumatra is of the best quality. Great quantities are shipped to Europe. Kerosene or illuminating oil finds its chief market in Java, in British India, China, Japan, Australia and East Africa, Alexandria is the most western market. Turbine.—This product serves as a substitute for turpentine.

Diesel and solar oil form intermediary products between kerosene and lubricating oil. Liquid fuel or petroleum residue is used as fuel in the refineries, while large quantities are shipped to different parts of the world. Batching oil finds a market in British India in the jute industry, where it is used to soften the fibres and make them supple during the process of weaving.

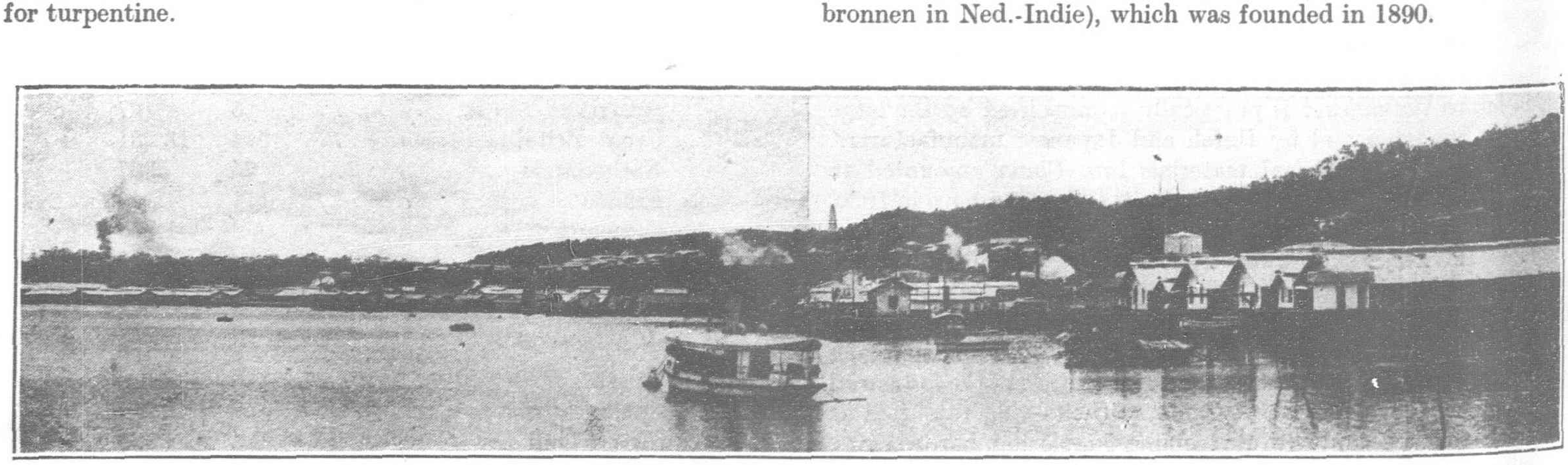
Lubricating Oil.—A modern plant for the distillation of engine oil is being constructed at Balikpapan, while there are two working in Java and Sumatra.

Paraffin Wax.—The paraffin factories in Java and Borneo put a large quantity of the finest paraffin wax on the market. The one at Balikpapan is one of the largest and best equipped in the world.

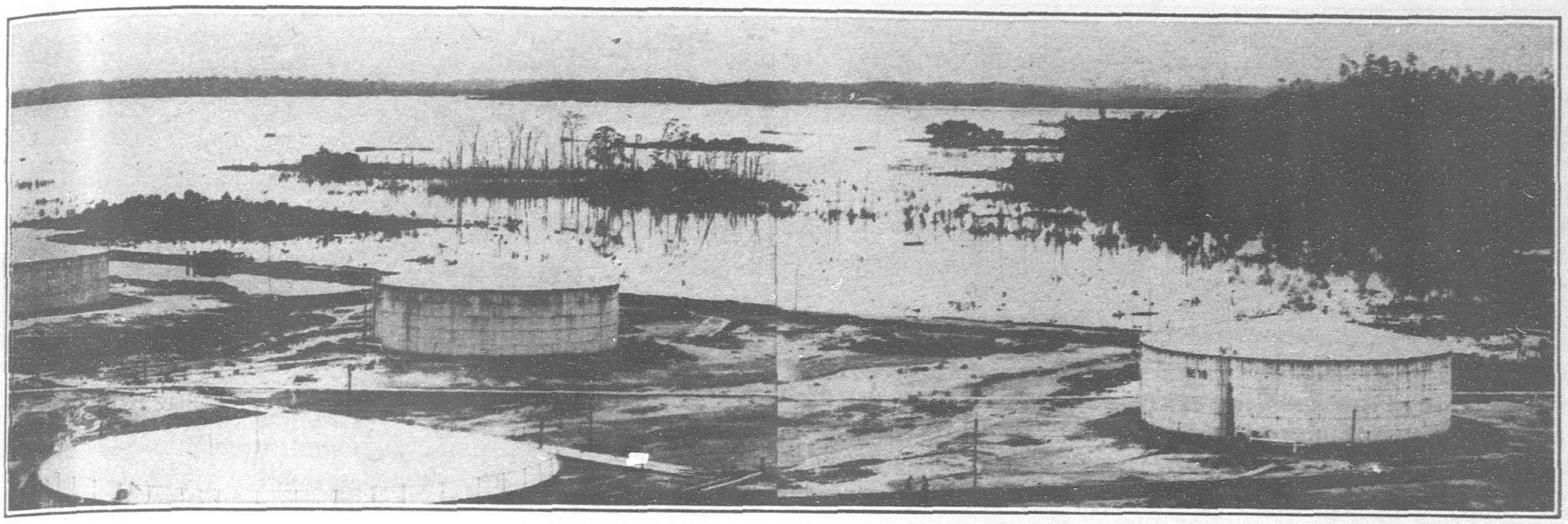
A part of the wax is used for the manufacture of candles which, on account of the high melting point of the Borneo paraffin, are particularly suitable for use in the tropics. The factory in Java provides for local consumption, the one at Balikpapan for export.

Battik wax finds a market in Java in the domestic battik industry. Asphalt is sold partly on the local market and the remainder abroad. A large fleet of tank steamers carries the products to all parts of the world. The greater part is shipped in bulk, but various ways of packing are also used, for which purpose the tin factories supply the material.

Petroleum Companies.—The principal company, which controls almost the whole manufacture and output in the Dutch East-Indies, though known under different names, is the "Royal Dutch Company for exploiting petroleum wells in the Netherlands Indies" (Koninklijke Nederlandsche Mij tot exploitatie van petroleumbronnen in Ned.-Indie), which was founded in 1890.



Royal Dutch Petroleum Works at Balik-Papan, Dutch Borneo, View from the Harbor



DUTCH PETROLEUM CO. AT BALIK-PAPAN, DUTCH BORNEO

Gradually this Company made connections with various other companies for the buying of the crude product, its shipping and distribution, with the aim of securing for itself a place in the world market. Beyond the Dutch East-Indies, also, it is steadily extending its sphere of activity for that purpose.

In 1907 the Company was reorganized and several new companies came into being namely :

(*a*) the Bataafsche Petroleum-Mij., affiliated to the Royal Dutch,

(*b*) the Anglo-Saxon Petroleum Company, affiliated to the Shell Transport and Trading Company,

(*c*) the Asiatic Petroleum Company.

The Bataafsche Petroleum Mij. obtains the crude oil at the producing centres outside of Java and manufactures the products.

The Anglo-Saxon Petroleum Company ships and transports them, while the Asiatic Petroleum Company has charge of the distribution and sale outside the Dutch East-Indies.

Inside the Dutch Indies this is handled by the Dordt Petroleum Company, which also obtains the crude oil in Java and manufactures the products.

The Royal Petroleum Company presents an example of a wide-branched organization, which has made it possible to bring the petroleum industry in the Dutch East-Indies to a high degree of perfection.

Following are the figures regarding the production and export of the Netherlands East-Indies for 1918 :—

Export of Petroleum Products in 100 L.

Production of crude oil in tons	Benzine and gasoline	Kerosene	Residue	Turpine
1.764.203	317.073	379.044	291.057	2.556

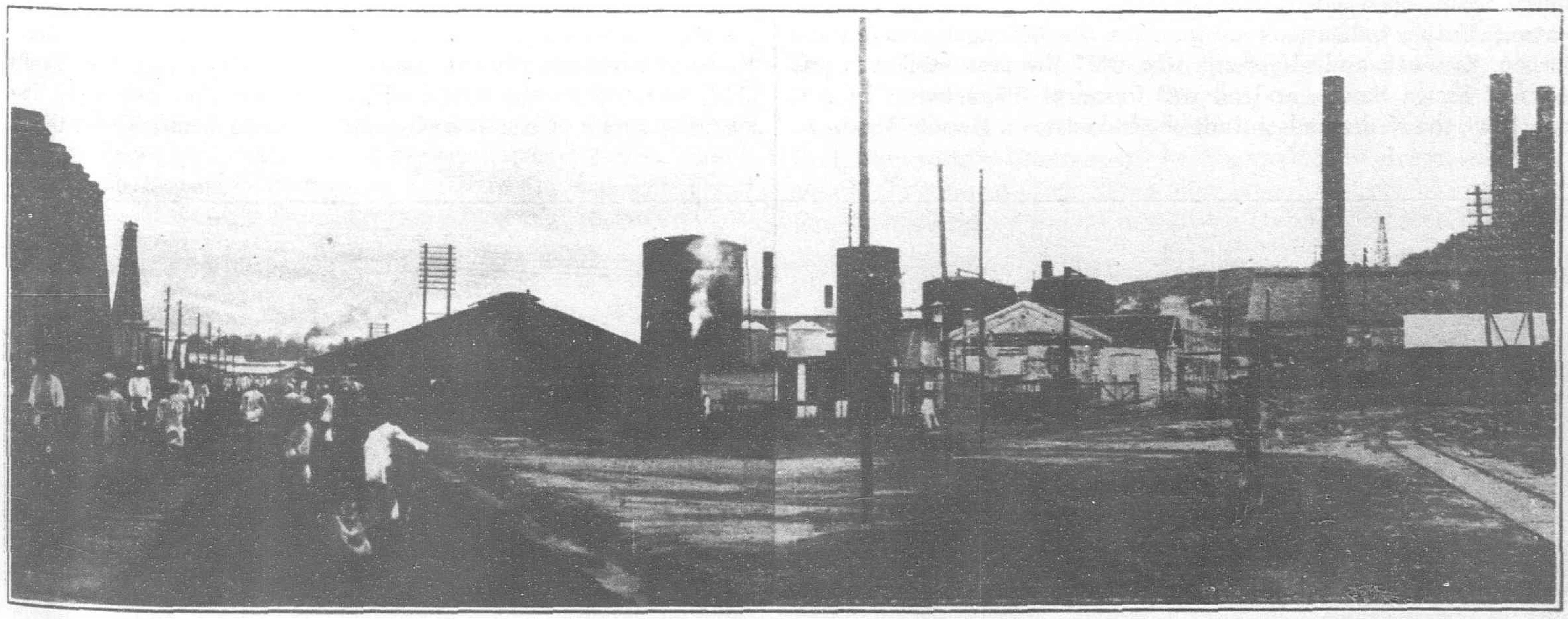
Export (in tons of 1,000 Kg.) of :

Paraffin Wax	Candles	Lubricating Oil	Asphalt	Greases
21.045	4.080	24.529	1.719	232

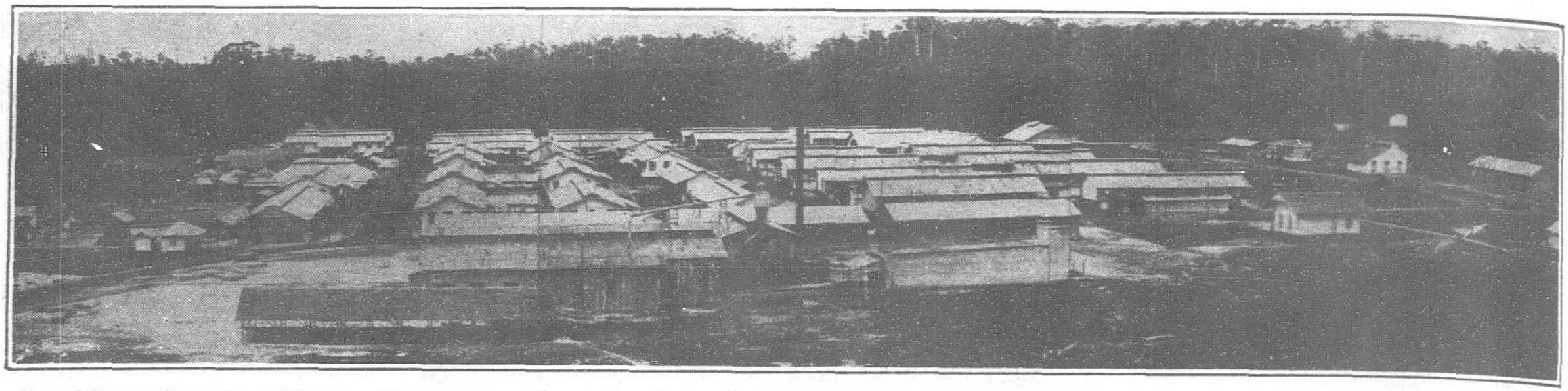
The Petroleums of Borneo

At the meeting of the Institution of Petroleum Technologists held on March 15, James Kewley read a paper describing the characteristics of the petroleums obtained in Borneo.

The petroleum industry of the East Indies is of comparatively recent growth, dating back in the case of Borneo to not earlier than 1897. The production of the Koetei fields, which were first developed, has steadily increased and has been supplemented by that of areas developed at later dates. Indications of petroleum had long been known in Borneo and the other islands of the East Indian archipelago. As far back as 1853 Motley noticed oil occurrences in the island of Labuan. In 1863 Menten found also seepages in the island of Tarakan, on the east coast. In 1866 a shallow well

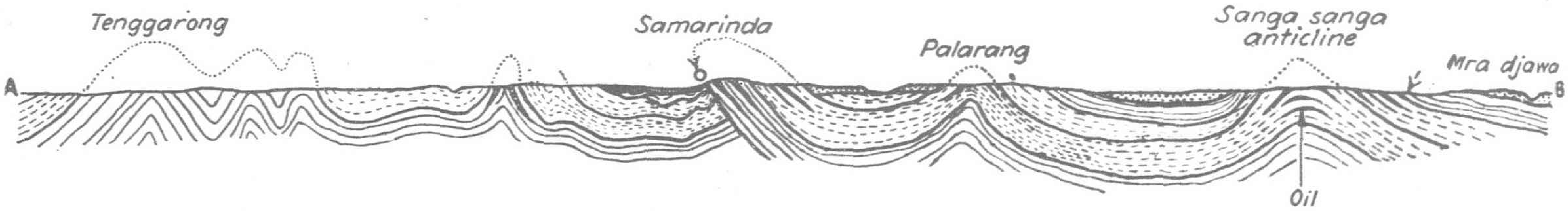


View of Main Plant of the Royal Dutch Petroleum Co. at Balik-Papan, showing the Buildings devoted to Refining the Crude Oil into Benzine, Kerosene and Fuel Oil. Capacity, 2,000 tons per day

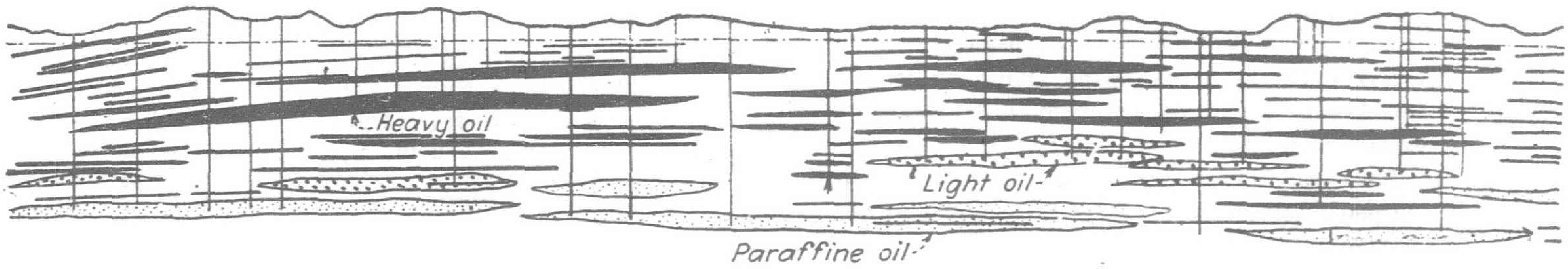


Royal Dutch Petroleum Works at Balik-Papan, Houses for Native Employees. The large building on the right is the Sulphuric Acid Factory with a Producing Capacity of 700 tons per month

was drilled in Labuan which gave a small flow of oil for thirteen years at least. Collingwood, in 1868, described a petroleum spring in British North Borneo, and stated that others were known. About 1887 three wells were in existence on the Klias peninsula on the north of Brunei Bay, and these gave oil in very small quantities. Menten, in 1888, obtained oil and coal concessions near the mouth of the Mahakam River, which concessions give to-day the most important output. In 1891 he obtained further concessions near Balik Papan, then a tiny fishing village, now a thriving refinery centre. Futher indications are found in the Bolongan area in West Borneo, Sarawak and elsewhere. In 1897 the first well was put down at Sanga Sanga, and oil was found at 58 metres. In August, 1898, the Nederlandsch Indische Industrie en Handle-Maatschappij, and about the same period several other companies, for instance, the Bombay-Burmah Trading Co. in British Borneo, and the Koetei Exploration Co. in East Borneo, began operations. In 1901 the Royal Dutch began to drill in Koetei, and the East Borneo Co. a little later. The production of these fields rapidly increased, and had already reached a figure of nearly 60,000 tons in 1900. At the present day the production of Borneo is about 4,000 tons per day.

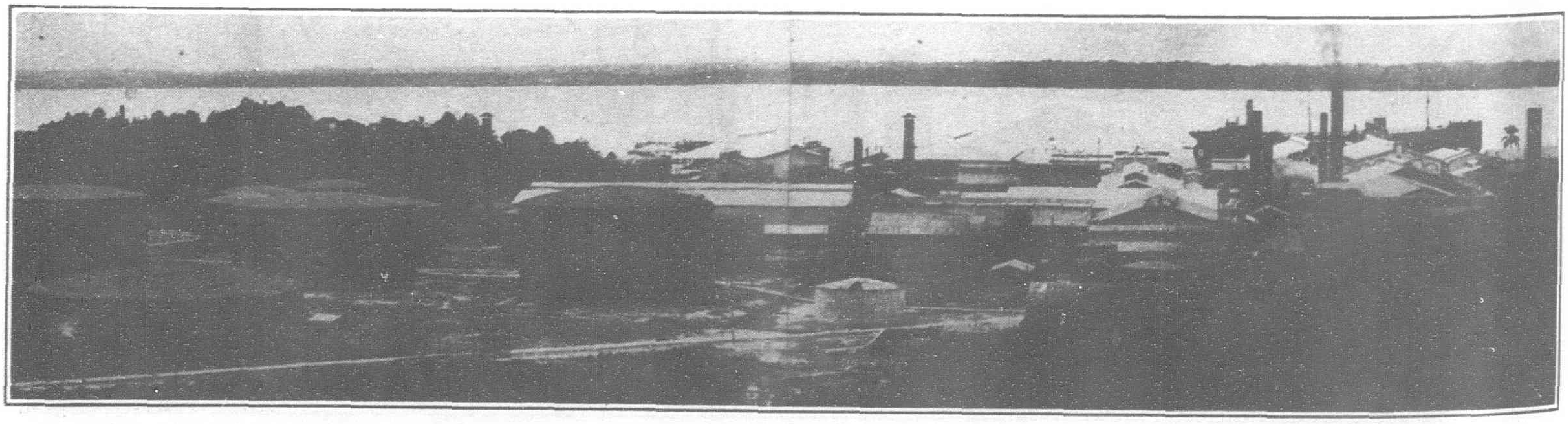


Cross-Section of Sanga Sanga Oil Field Across Anticlines and along the Mahakan River (after Jezler)



Longitudinal Profile along the Sanga Sanga Anticline, showing position of Sands (after Jezler)

There are at present three important producing areas in Borneo: (1) the Koetei area, extending from the mouth of the Mahakam River southwards toward Balik Papan Bay; (2) the Tarakan field, situated on the island of Tarakan on the east coast, about 80 miles south of the British North Borneo frontier; (3) the Miri



Royal Dutch Petroleum Works at Balik-Papan, Dutch Borneo, showing portion of Plant, Docks and Storage Tanks. To the right is a Tank Steamer loading, also the Paraffine Wax Factory, Capacity 2,000 tons per month, and the Lubricating Oil Works, Capacity 1,200 tons per month. To the left is the Candle Factory with a Capacity of 350 tons per month

area, on the west coast in Sarawak, about 150 miles south of Brunei Bay. These three areas differ to some extent geologically, and considerably in respect to the types of oil they yield.

In the Koetei fields three distinct types of crude oil are found, namely, heavy asphalt oils in the upper strata, light asphalt oils at greater depths, and paraffin wax oils at still greater depths.

The structure of the Tarakan field is that of a system of two domes with a depression in between, the major axes of which run in a north-south direction. In this area, which is also of delta formation, Poliocene sand predominates. The field is developed in part of the delta which was nearer the coast and where consequently sands predominate, the interlying clays being not so well marked. Pliocene coals, or rather lignites, often containing boulders of older coal from the late Miocene formation, are frequent. The oil from this field is markedly uniform in composition.

The Miri field lies on the west coast of Borneo. The geological structure here is not yet so well known as that of the two fields described above. There is a well-marked anticline, the eastern wing being very much the steeper. The oil is drawn from the western wing. The strata here are also of Miocene age, and coals are absent. The oils of the Miri field are fairly uniform in character, but differ fundamentally from those of the Koetei and Tarakan fields.

The crude oils of Koetei fall into three main classes : (*a*) heavy asphalt-base crude oils ; (*b*) light asphalt-base crude oils ; (*c*) light paraffin-base crude oils. The oils have one character which sharply differentiates them from practically all other crudes so far known. The specific gravities of the distillates are much higher than those of corresponding distillates from most other crudes. The same applies to the refractive indices. These characters, and the inability of kerosenes produced from these crudes to burn in any ordinary lamp without arrangements for an extra supply of air, were naturally soon discovered (Ragosin, *Pet. Rev.*, vol. 8, 1903, p. 59). The reason for this is the presence of unusually large proportions of aromatic hydrocarbons in these oils. The occurrence of aromatic hydrocarbons in crude oils has long been known. In fact, aromatic hydrocarbons have been found in small quantities in most crude oils, but seldom to an extent greater than 15 per cent., usually to a much less extent. Examinations of Koetei oils have shown that they contain extraordinary quantities of aromatic hydrocarbons, amounting to as much as 40 per cent., consisting chiefly of benzine toluene and meta-xylene.

It is interesting to note that the high aromatic content of Koetei oils, which some years ago rendered them of comparatively low value, eventually rendered these oils of the greatest importance to the British empire as a source of toluene.

The consideration of a few generalizations drawn from a study of the occurrence and characters of the crude oils of Borneo, particularly of the Koetei field, may be found to throw a little light on the origin of petroleum. The crude oils of the Koetei field were either developed *in situ* or else they migrated from some mother rock into their present reservoirs. If these oils were found *in situ*, then they must be of vegetable origin, as there is no indication in the sands and coals of sufficient animal matter to have yielded such quantities of oil. Further, had they developed *in situ*, they must have arisen either from the coal or from the vegetable matter which formed the coal. Experience does not lead one to expect that they have been formed from the coal, and the change of vegetation, partly into coal, partly into oil, is equally contrary to experience. The other view, that the oils migrated into their present position, is much more probable, and is supported by certain evidence afforded by the differences in composition of the crude oil from different horizons. Conditions advantageous to migration exist in the Koetei and Tarakan fields. In the former, clays and sands alternate, but the layers are discontinuous owing to their formation under delta conditions, so that a zigzag course is open to the oil migrating upwards, there being, however, many opportunities for retaining portions of the oil under impervious clays *en route*. A possible source of the oil is to be found in the foraminifera limestone (which is a shallow water deposit accumulated quickly) of the early Miocene, or possibly in the marl formation of the underlying Eocene. It is possible that as the oil migrated upwards, coming into contact with or passing through the coal beds, some chemical interaction between the oil and the coal may have taken place. One might expect, therefore, differences in composition of the oils which have been arrested in their upward course by local obstacles at different horizons. This is, indeed, undoubtedly the case. The oil found at the greatest depths so far drilled is rich in paraffin wax. The oils found at higher levels are poorer in paraffin and richer in aromatic and asphaltic constituents. The early Miocene greensand formation, which underlies the Koetei petroliferous formations, has not yet been penetrated by borings, but it is found outcropping in the Palarang anticline, which runs parallel to that of Sanga Sanga, some miles further inland. The nature of the oil found there in these lower strata is in accordance with the view put forward. This oil had the relatively low specific gravity of 0.831, yielded 40 per cent. of a kerosene of specific gravity 0.809, which burnt well in a Hinks lamp, and which was of very low aromatic content. The crude was, moreover, rich in paraffin wax. This oil comes from a level below the coal-bearing strata. These facts suggest the possibility of the paraffin-rich and aromatic-poor oil having undergone some chemical interaction with the coal in its passage upwards, which resulted in a diminution of the wax content and increase in the aromatic and asphaltic constituents. It is difficult to understand in what way such a change could have come about. The facts, however, exist and need some such explanation. In the Miri fields, where coals are absent, the oil is low in aromatic and asphaltic content ; the oils of Perlak, in Sumatra, where coals are absent, are lower in aromatic and asphaltic content than those of Moera Enim, in which field coals are present. The fact also that the difference in character with increase of depth is so very much less marked in the Tarakan field, where the geological conditions are much more favorable for easy migration, lends support to this idea.

Petroleum in British North Borneo

At the last annual meeting of the British North Borneo Company, the chairman said that the position as regards oil is interesting. The British Borneo Petroleum Syndicate granted the Kuhara Mining Company of Japan a sub-concession to prospect for oil in the whole territory, except the Klias Peninsula and Mangalum Island, the oil interests in which were reserved for exploitation by the D'Arcy Exploration Company, which is a subsidiary of the Anglo-Persian Oil Company. The sub-concession to the Kuhara Company carried a right to extension for a further two years until 1921, but owing to the company having omitted to give the necessary notice, their prospecting rights have lapsed and are now vested in the D'Arcy Exploration Company. The D'Arcy Company now propose to proceed with the geological examination which was being carried on by the Kuhara Company, so we can rest assured that no stone is being left unturned to trace all available sources of oil in the territory. As the result of their prospecting operations, the Kuhara Company have decided to bore for oil at Sequati, in the north-west, where they are about to commence operations, a large quantity of drilling plant having already been landed.

As regards the Klias Peninsula, the presence of oil has already been proved there. The D'Arcy Company have intimated, however, that they do not consider that the area promises sufficiently large quantities of oil to justify further exploitation. Notwithstanding, the British Borneo Petroleum Syndicate are pressing for the exploitation of this area, and we may hope that operations will be resumed at no very distant date.

Mineral Wealth of Tonkin

By G. GIRAUD

Commercial Attache for French Indo-China in the United States

TONKIN is situated in the northern part of French Indo-China, between the Gulf of Tonkin, Southern China, Northern Annam, and Laos, with an area of 119,000 sq. kms.

It is divided in two distinct parts: the Delta, with its great rivers;—the Thai-Binh and the Song-Coi (Red River) forming alluvial deposits covering an area of 13,000 sq. kms. and the upland region consisting of hilly country rising gradually towards the North into mountainous regions, with deep valleys forming the foot-hills of the Chinese chains of mountains, Yunnan and Kuangsi. In Tonkin alone the Red River covers 670 kms. (409 miles). It is the natural route of transportation for the products of the great Chinese province of Yunnan, thus making Tonkin the most important and favorable means of penetration into China.

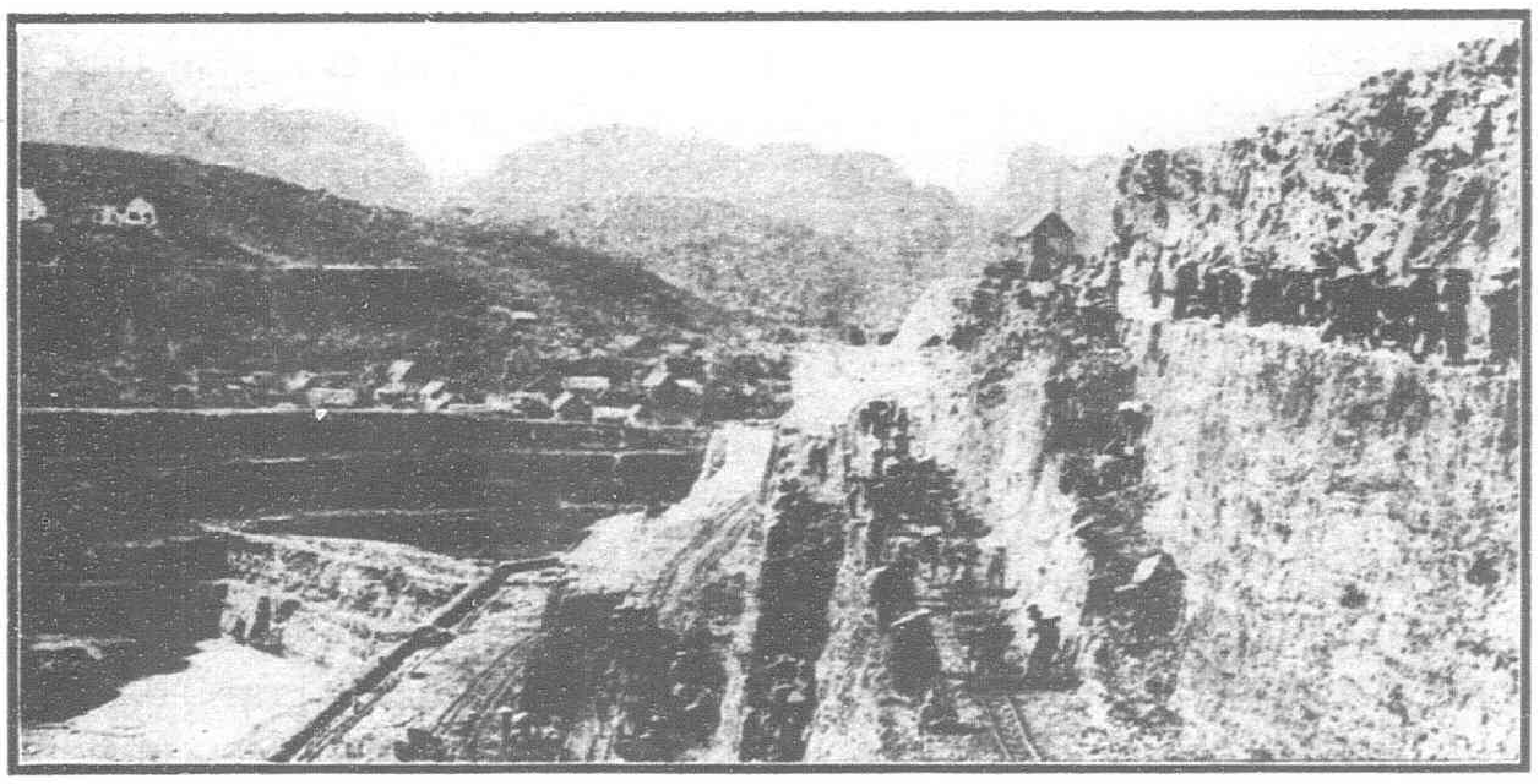
Besides the Red River, the railroad connecting Haiphong with Yunnan-Sen, capital of the Chinese province of Yunnan, facilitates this penetration, and an extension of this railroad to Szechouen, the richest province in China, would minimize its distance from Tonkin to 50 hours instead of 30 days of difficult travel. The importance of this has not escaped the attention of other countries the English try to reach it from the valley of the Iraouaddy and by the cañons of Tibet; the Russians tried the penetration by way of Turkestan; Siam tries to divert the traffic from the Upper Mekong by building a railroad from Bangkok via Lopburi, Makon-Sawan, Outaradit, which is far from being completed; the French sought for a long time a practicable route through the valley of the Mekong, across Cochin-China and Laos. Of all these routes, the one of Yunnan across Tonkin is the most rapid and comfortable, going through rich mining regions. "The Yunnan railroad has already intensified commercial relations between Tonkin and Southern China" — to quote from the latest report of the British Consul at Saigon—"and has made of Haiphong the transit port of Chinese limithroph provinces."

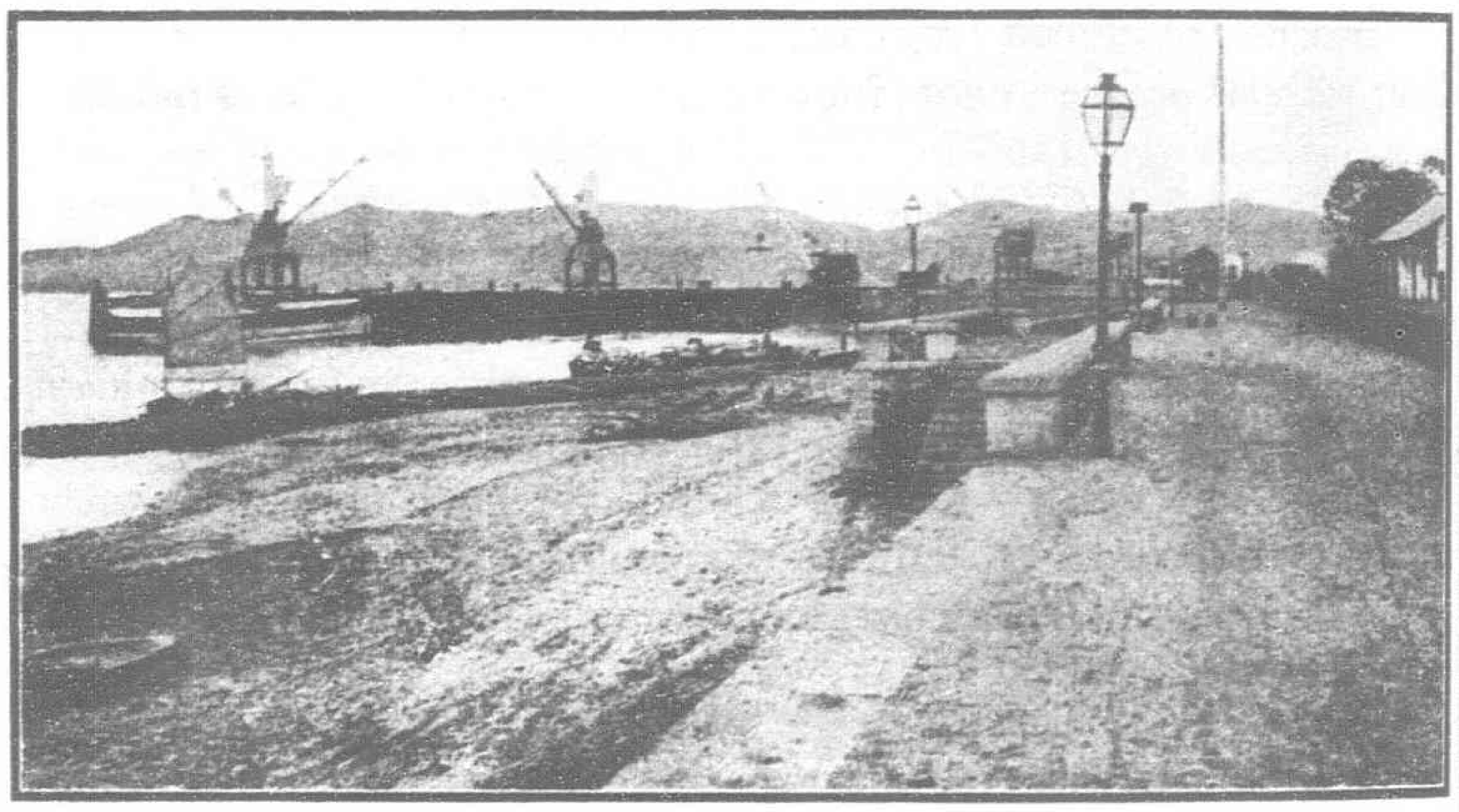
The mineral wealth of Yunnan had for a long time attracted the attention of scientists, engineers, and financiers. Its exploitation and its exportations by way of the Tonkin route, are big sources of profit. Similar mineral wealth is found in Tonkin, of which the soil and subsoil are full of inestimable promises. The work of surveyors and prospectors has been unfortunately retarded by the war. Permits to survey granted by the government in 1919 totaled 189 and the number is increasing slowly. In the same year, four concessions for new mines were granted, bringing the total number of concessions granted up to 336.

Coal Fields

In Asia, as elsewhere, the countries possessing coal-fields have a future. Out of the five countries forming the "Union Indo-Chinoise Française," Tonkin is the richest in coal-fields. The most valuable strata are found in the coal pits stretching from Bac-Ninh to the Island of Kebao, running through Dong-Trieu and Hongai. These strata are anthracite of very good quality, containing from 5 to 12 per cent. volatile matter and giving an average of 7,500 calories. About 50 kilometres north of Bac-Ninh are found "Affleurements Houilles" 200 to 300 metres (600 to 900 feet) wide, which may be followed for 15 kilometres between Thai-Nguyen and Can-Vau.

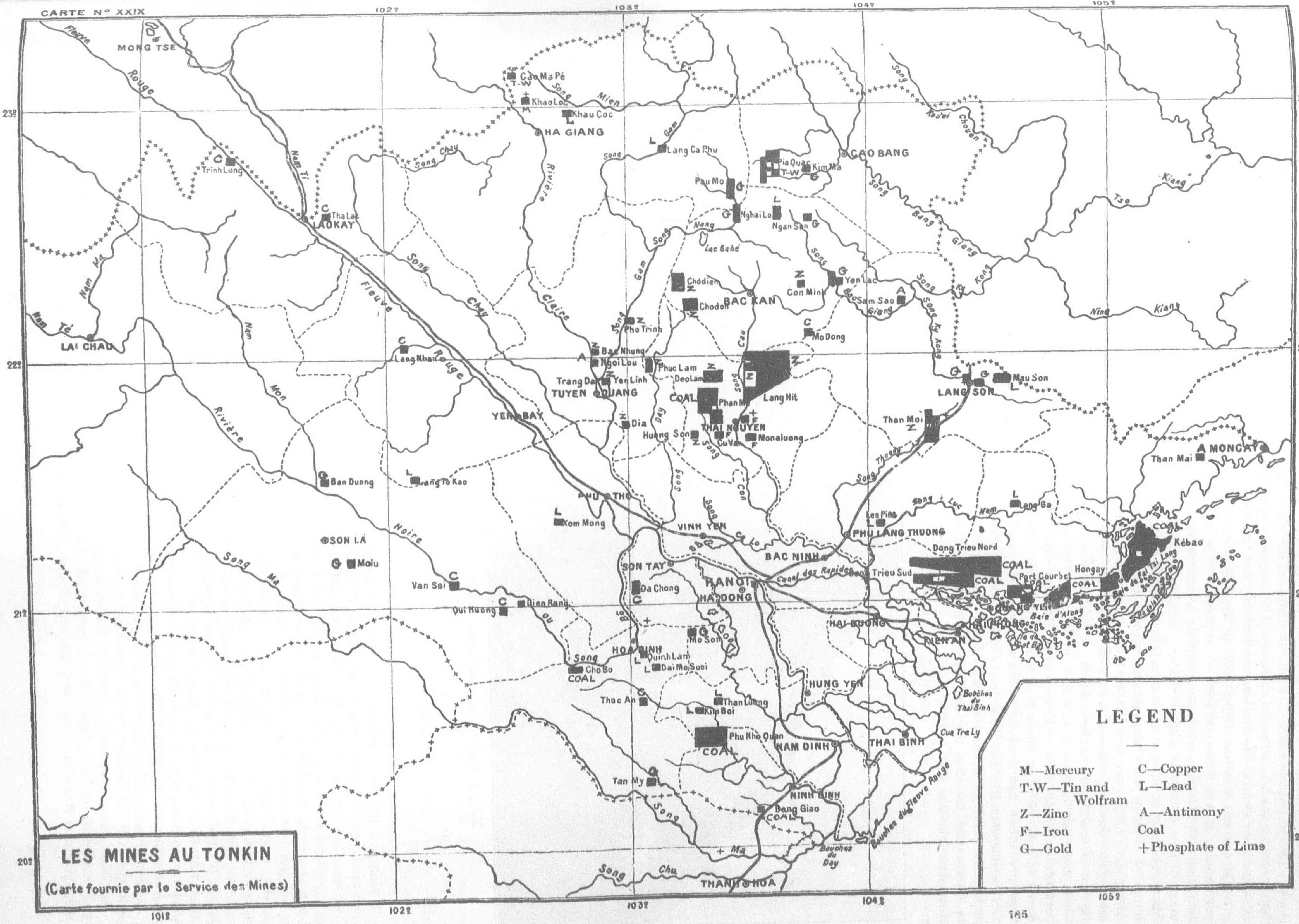
The richest coal mines, namely those of Hongai, Kebao and Dong-Trieu have the advantage of being situated on the coast of Bay Along and possessing wharves in deep and calm waters, thus permitting direct loading of large deep sea vessels. The Hongai mines are the biggest producers amongst Indo-China coal-fields: from 92,000 tons in 1892, their production increased to 250,000 in 1901; to 300,000 in 1902; to 498,000 in 1914; to 540,000 in 1915. This increased production is due entirely to the development of their exportation to China and Japan. A part of the coal dust of these mines is compressed into bricks with the addition of 10 per cent. of coaltar and 20 per cent. of Japanese soft coal, thus giving 8,500 calories.


Open Cut Coal Mine at Hongay


Coal Loading Cranes on Hongay Pier

The Kebao coal-fields extend over 25 kms. (15.5 miles) in a northeastern direction, being a prologation of the Hongai mines. The caloric power of this coal varies from 7,000 to 7,850.

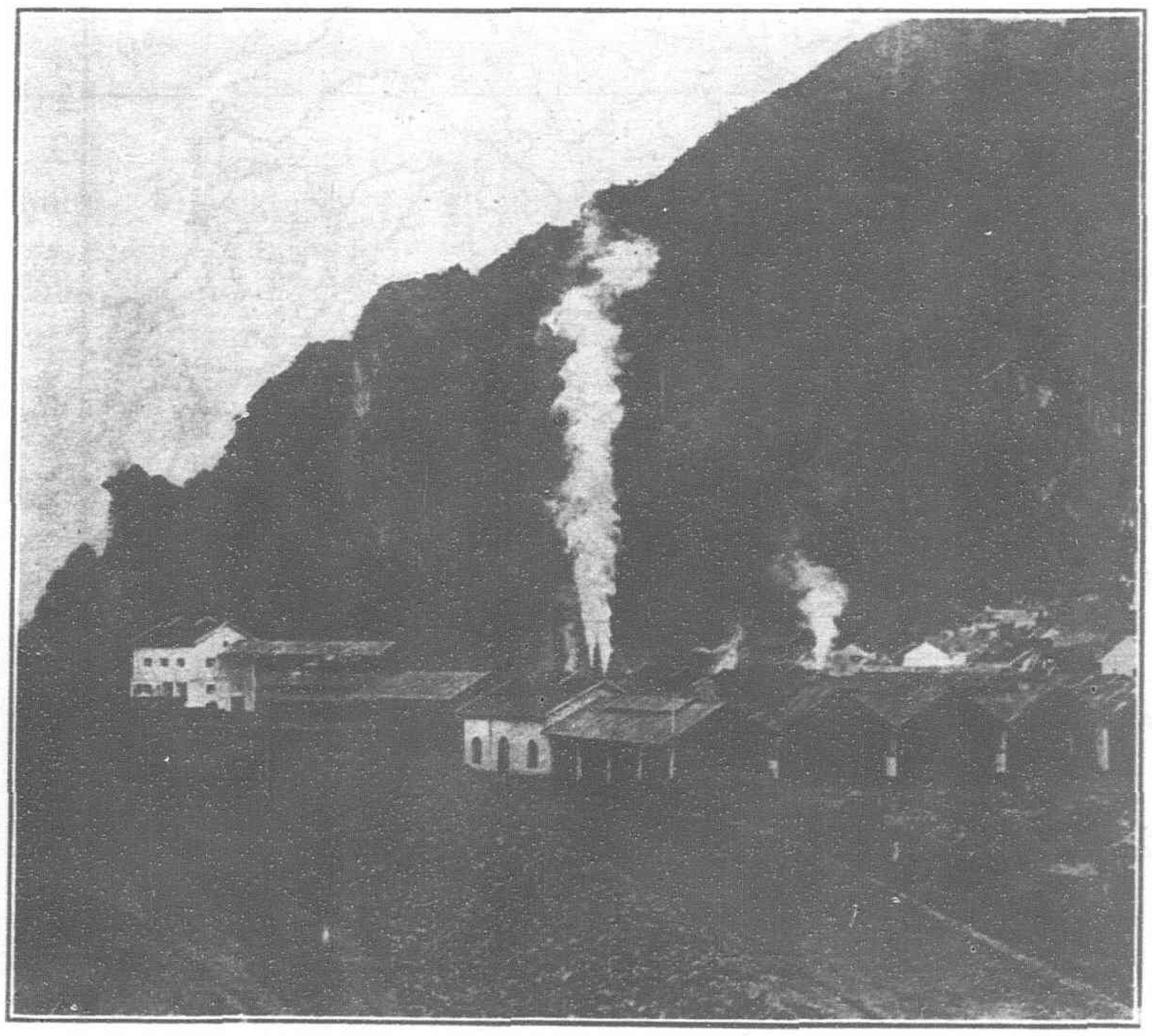
East of Kebao, between Tien-Yen and Monkay (near the Chinese boundary) are situated the Tien-Yen mines, little worked as yet, though of good quality. The coal-fields of Kebao-Hongai extend west near Dong-Trieu toward the "Sept-Pagodes" to Bac-Ninh, constituting the coal basin of Dong-Trieu. About 50 kilometres (31 miles) N.W. of Bac-Ninh are the coal fields of Yen-Bai. Those of Lang-Son, with the "affleurement" of Ki-Lua and Loc-Binh, are also worthy of attention. The output of the coal



LES MINES AU TONKIN

(Carte fournie par le Service des Mines) fields situated near the sea coasts finds a ready market in the Far East. The output of Central Tonkin will furnish, if intensified, the fuel necessary for the industrial activities of the region. It should be noted that Central Tonkin has excellent railroad facilities.

The coal mines of Indo-China yield an average of 650,000 tons per annum, of which 350,000 tons are exported. The home consumption of 300,000 tons is increasing rapidly because of the development of new industries and particularly of ship building plants. The greater part of this coal production is furnished by the celebrated mines of Hongay (they are open air mines) along the banks of Along Bay, which produces 540,000 tons of coal per annum. For many years this coal was denied its real value to the great profit of the Cardiff and Japanese coal. To-day, Cardiff coal is rare on the China seas, and Hongay coal is sold in Japan. The next in importance are those of Dong-Trieu and of Mao-Ké. The coal produced by both of these mines is of heavy quality and as a result their production has doubled within the last two years. While there seems little likelihood that Indo-Chinese coal mines will ever supply the needs of France, because of their situation, there can be no question but that they are likely to replace imported coal throughout the Far East.



Hongay Coal Bricquette Plant, Tonkin

Iron Ore

Of all the iron ore strata in Indo-China, those of Thai-Nguyen in Tonkin are the most advantageously situated for profitable exploitation. They extend over 45 kilometres (28 miles) between Nha-Nam, Co-Van, Mot-Luik-Nham and No-Nha-Con, and have many pockets, some of which contain more than 15 million tons of ore above the level of the plains. The subterranean wealth has not yet been determined. The ore contains brown and red hematite, oxydulated and magnetic iron. It is very pure and assays at an average of 60 per cent. The proximity of the Thai-Nguyen factory and Dong-Trieu coal-fields should encourage the establishment of steel and blast furnaces in this region, owing to the fact that all around Dong-Trieu are found rich strata of castine and manganese, so necessary for the economical treatment of iron ore. More iron mines are to be found 25 kilometres (15.5 miles) N.W. of Cao-Bang, on the Song-Bag-Giang River, at Moxat, and at Bu-Xat, in the N.W. of Laokai, on the right bank of the Red River.

Statistics show that every year the Far Eastern countries, going from British India to Japan, import nearly one million tons of steel products from England, Belgium and France, but their cost price is unfortunately very high on account of the heavy freight charges and the expenses of middlemen. The industrial development of French Indo-China, as well as that of South China, together with the projected construction of railroads, insure a brilliant future for the metallurgical plants of Tonkin.

Copper Mines

Copper is found in nearly all parts of Tonkin Some strata are very rich, like those of the Black River, 27 kms. (18.7 miles) upward from Van-Yen in a mountainous region covered with forests and bamboo. The cropping-out of copper is seen in green and tender rocks of schist, which nevertheless is resistant. On account of the dense forests of this country these lodes have escaped attention from the Chinese and natives, a population always looking for copper. This ore contains an average of 14 per cent.of copper and 14 grammes of gold to the ton. A rational exploitation would be profitable, as native labor is easily obtained among the Muongs (tribes) and the numerous Chinese living in the valley of Phu-Yen.

Other cupriferous lodes are found near Bien-Dong, north of Haiphong ; at Kep, 9.3 mil. north of Phu-Lang-Thuang and near Pho-Hing-Giu, 31 mil. N.E. of Thai-Nguyen. Forty kms. (24.8 miles) N.E. of Laokai and near Trai-Huit are situated important strata, on the right bank of the Red River, most desirable on account of the proximity of the Yen-Bai coal pits. Near the southern boundary of Tonkin, in the extreme northern part of Annam, west of Than-Hoa and the Gulf of Tonkin, is situated a very large copper bed. As the copper ore found in Tonkin gives a very good percentage, a general and up-to-date exploitation would give good profits.

Cho-Dien Zinc Mine, Tonkin

Zinc

The regions of Tuyen-Quang, Thai-Nguyen and Lang-Son are rich in zinc. The mine of Trang-Du in the province of Tuyen-Quang produces yearly about 10,000 tons of ore. The output of Khein and Bac-Nhung mines in the same region is most satisfactory. In the Lang-Hit and Van-Lang regions, the mines of Thai-Nguyen have an output equal to those of Tuyen-Quang. Next in order come those Lang-Son in the region of Than-Moi. The zinc and tin beds of Tonkin offer a bigger commercial value than any other ore beds. For the last ten years zinc mines have been worked according to the demands of reasonable exploitation. The following figures will convey an idea of the importance of these mines :—

1904	200 tons of ore
1908	9,300 ,, ,, ,,
1910	20,000 ,, ,, ,,
1914	31,500 ,, ,, ,,
1915	34,400 ,, ,, ,,
1916	41,000 ,, ,, ,,
1918	28,000 ,, ,, ,,
1919	48,000 ,, ,, ,,

Tonkin zinc gives an average of 40 to 56 per cent.

Japan is the principal buyer. Favored by her geographical situation, she has almost cornered the Haiphong market to the disadvantage of other nations who are handicapped by the high freight rates.

In 1915 the average price of calamine with a percentage of 50 per cent. zinc, was 180 francs per ton, while during the first half-year of 1914 it was about 90 francs. The continuous rising prices put zinc at 300 frcs. per ton f.o.b. Haiphong.

Tin

In the Caobang region near the Chinese frontier are found extensive beds of tin, which are situated in a high valley on the slopes of the Pia-Quac mountain in the district of N'Guyen-Binh, circle of Cao-Bang, and are successfully worked. The ore contains an average of 50 per cent. of tin, some going as high as 65 per cent. The proportion of ore to a cubic metre of dirt, after washing out, is 5 kilos. The tin beds of these regions deserve the particular attention of capitalists on account of the high price of this metal. It find a ready market either in Haiphong or Long-Tcheou, from where the Chinese take it to Hongkong by the Song-Bang-Giang and the Canton River. Tin is often found mixed with wolfram or tungsten. In 1909 196 tons of tin and 17 tons of wolfram were exported ; in 1916, 424 tons of tin were taken out. The average price for a ton of tin is 5,000 francs. The unity of "anhydride tungstique" is quoted at 64 francs in the Haiphong market. In Europe it is worth about 110 francs.

Antimony

Mines of antimony are found in Tonkin in the regions of Monkai, Cao-Bang, Laokay and Phu-Nho-Guan, also on the northern boundary of Annam. This ore is brought directly either by junks or by the Yunnan railroad to the plant which is situated near Haiphong. Tonkin antimony ore is not very rich, but this plant can treat it on as low a basis as 14 per cent., and the metal produced being first class (96.60 per cent. pure antimony) finds an eager market in the Far East and the United States. The annual production of this metal is 1,500 tons, absorbing almost all the local ore.

Manganese

Two extensive manganese beds are known to exist in Tonkin : One near Philiet ; the other near Thai-Nguyen. The ore is concretioned pyrolusite (bioxyde of manganese) purple or blackish in color. This metal could be very useful in the treatment of iron ore at the Thai-Nguyen mines. Outside the metals already mentioned Tonkin possesses other minerals such as : argentiferous lead, mercury (cinabre), graphite, etc. . . . . , not to mention gold and precious stones.

"White Coal" in Tonkin

Out of all the French colonies and protectorates, Indo-China is the very spot where industry is developing most rapidly. The utilization of "white coal," hydraulic power, renders enormous services, especially in Annam. Laos and Tonkin, where river rapids and waterfalls are numerous. In Tonkin, the necessity of treating zinc ore at the mines made the utilization of waterfalls desirable. Chobo is an ideal place for the erection of a hydraulic power plant for the treatment of cyanamide calcaire — a new product replacing azoted fertilizer. Carbide of calcium, which is the basis of this product, is extremely abundant in Chobo. Japan and the Dutch Indies import at present 200,000 tons of cyanamides.

Conclusion

The mineral wealth of Tonkin offers a vast field of exploitation. New discoveries are made continuously, and even gold is being found in veins and in river beds. The latest discoveries are phosphates and graphites. The favorable geographical situation of Tonkin, with its valley of the Red River penetrating into China, its railway of Yunnan and other railways going toward Kwang-Si, make for industrial development, which in turn will cause important orders of all kinds of building material, machinery and tools. Former Governor-General Doumer in his report to the secretary of the colonies, ten years ago, said, "Indo-China is the storehouse of the Far East, principally of Japan. Tonkin alone demonstrates this assertion, especially in the field of mineral wealth." The official report of the "Service des Mines de l'Indochine," Indo-Chinese mining department P.W., gives the mining production of Tonkin during 1919 as follows :—

Coal : 665,000 tons, as against 636,000 in 1918 and an average of 645,000 annually during the war ; tin and tungsten : 429 tons ; zinc : 15,934 tons as against 200,000 in 1918, and an average of 41,000 in the years 1915-16-17 :

Other figures for 1919 were :

Iron	5,100 tons
Phosphates	7,050 ,,
Graphite	7,501 ,,

These figures speak by themselves. They show that the upsetting influences of war did not at all affect Indo-China, and especially Tonkin. The critical period which came after the war is over now, and Tonkin can follow her economical development with absolute confidence in its splendid future.

Industrial Notes from Moukden Customs

There was considerable building activity in the Japanese railway zone during 1920, but at the end of the year it is reported that there are some 300 houses vacant. In the foreign settlement new houses have been built by the Standard Oil Company, the Banque Industrielle de Chine, and the British-American Tobacco Company, while many new buildings were left uncompleted at the beginning of the winter. In the city several of the larger Chinese business houses have built new premises in foreign style, including the Bank of Communications.—On the 1st December a long-distance Japanese telephone service between Moukden and Antung was inaugurated.—Railway extension of the Ssŭ-Chêng Railway in the following directions has been planned : from Chengkiatun (鄭家屯) westward to Tungliaohsien (通遼縣). a distance of about 80 miles, and a further extension from Tungliaohsien in a north-westerly direction to Taonanfu (洮南府), a distance of some 170 miles.—A Sino-Japanese Company has been formed for agricultural development in the neighborhood of Chengkiatun and Tungliaohsien.—The results of the experiment made by the Toa Tobacco Company in cultivating foreign tobacco in the neighborhood of Fenghwangcheng have not come up to expectations, owing to lack of experience on the part of the farmers and to unfavorable climatic conditions.

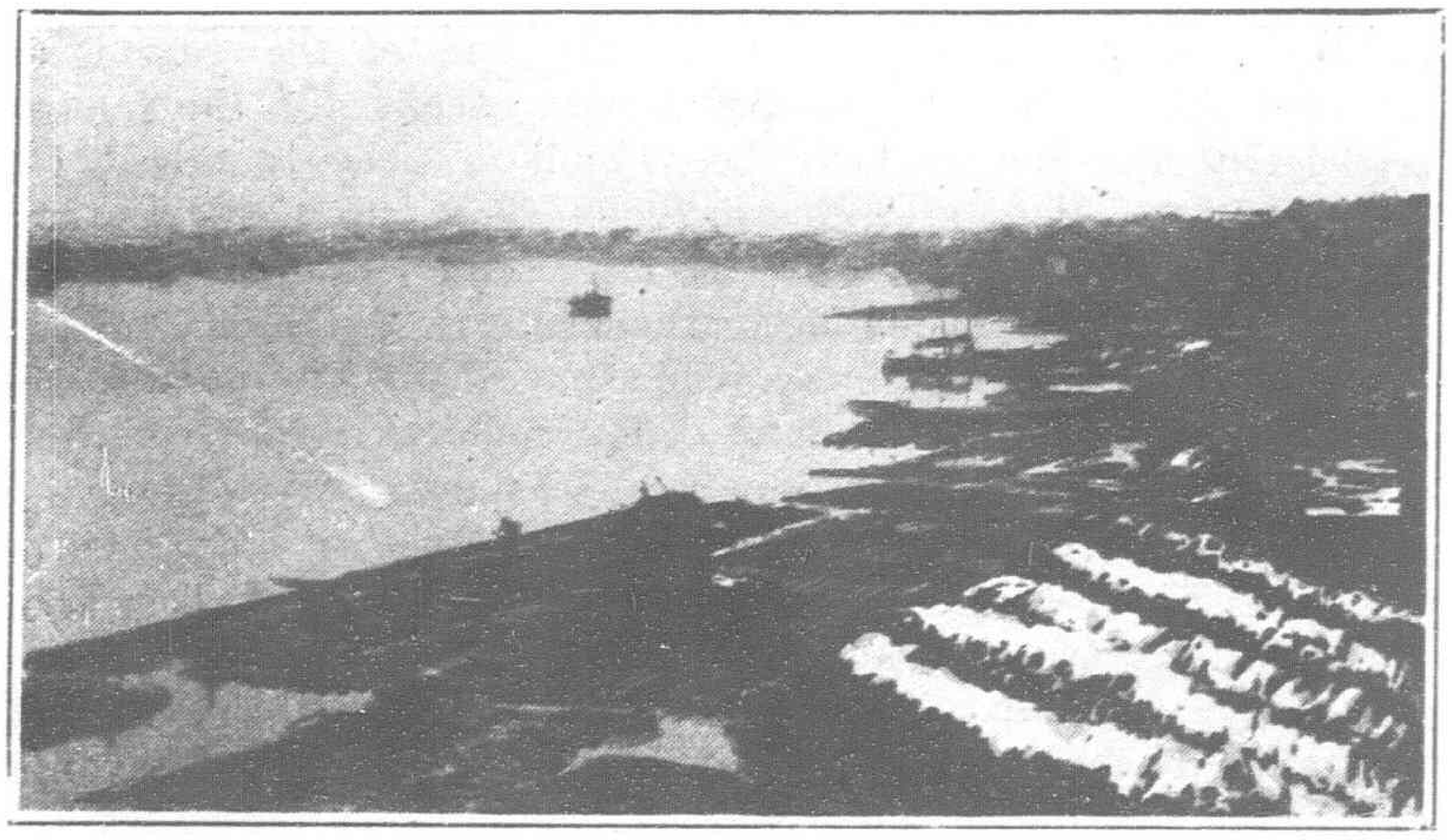
The Kirin Kwainei Railway

THE expiration of the provisional agreement for the financing and construction of the Kirin-Kwainei Railway having expired, it is reported that Mr. Ono, vice-president of the Industrial Bank of Japan, now in Peking, has been endeavoring to obtain its renewal. This has given rise to many loose stories about further Japanese loans to the Peking government in contravention to the consortium understanding. As a matter of fact this line is outside the scope of the consortium, and Japan is free to negotiate the loan for its construction whenever the Peking authorities are ready to to take up the matter. The construction of this railway was provided for in an agreement signed between China and Japan on September 4, 1909, to settle the questions surrounding the Korean boundary dispute. Article 6 of that agreement states :

"The government of China shall undertake to extend the Kirin-Changchun Railway to the southern boundary of Yenchai, and to connect it at Hoiryano with a Korean railway, and such extension shall be effected upon the same terms as the Kirin-Changchun Railway. The date of commencing the work of the proposed extension will be determined by the government of China considering the actual requirements of the situation and upon consultation with the government of Japan."

Subsequent to the above, a further agreement was entered into on October 12, 1917, between the Chinese government and the Yokohama Specie Bank for a loan of Y.6,500,000 with the Kirin-Changchun Railway as security, the terms of which placed the administration of the railway in the hands of the South Manchuria Railway Company, who receive two per cent. of the net profits for its services.

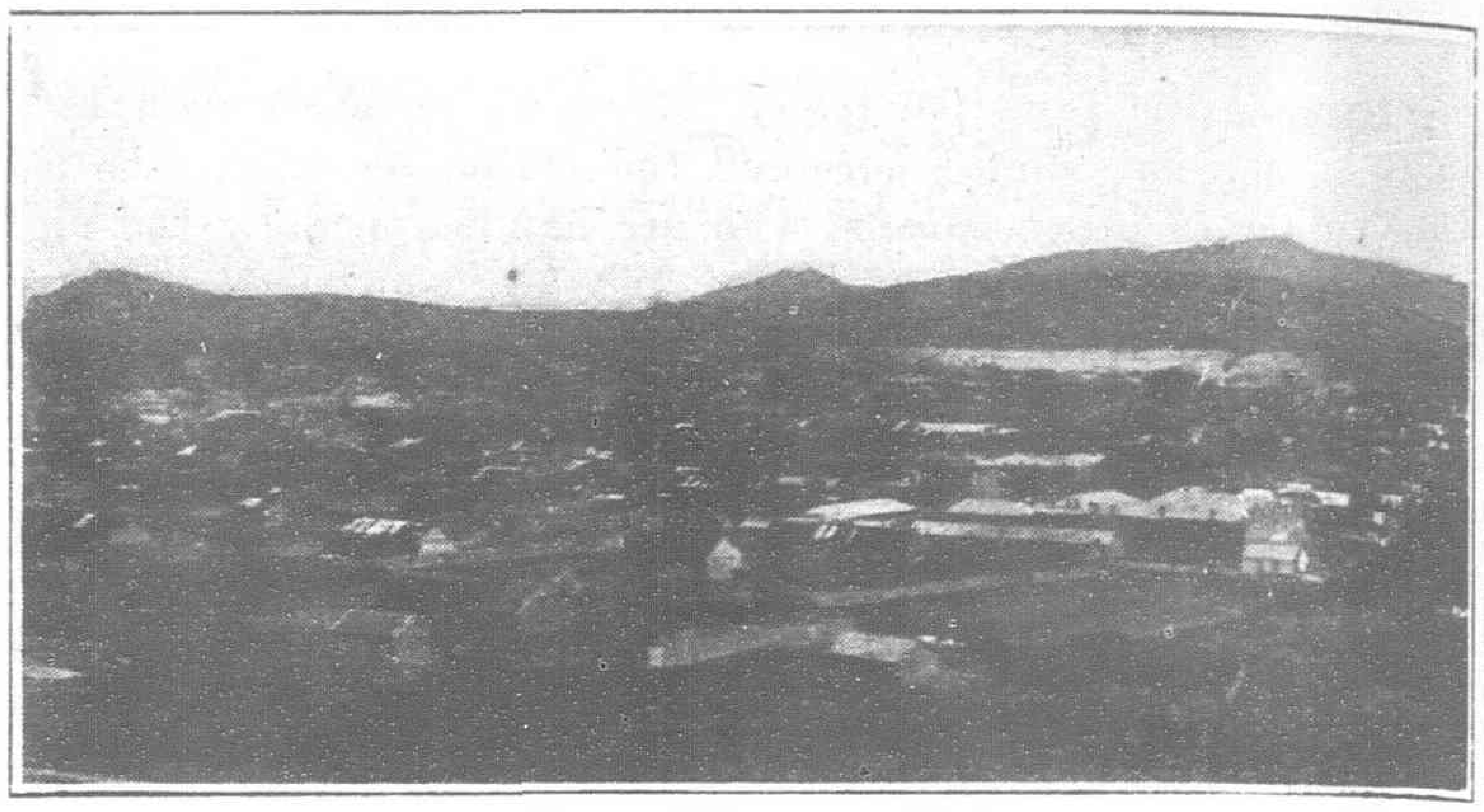
On June 18, 1918, a preliminary agreement was signed between the Chinese ministry of communications and a group of three Japanese banks (the Industrial Bank of Japan, Bank of Chosen and Bank of Taiwan) for the construction of the extension of the Changchun-Kirin line to Hweining on the Korean border, opposite the Korean town of Kwainei, the terminus of the short line which leads to the Korean seaport of Seishin. The amount the loan was reported to be $20,000,000, to be floated in the form of Chinese government bonds bearing interest at five per cent. and to be issued by the three Japanese banks. The security was to be the physical property and earnings of the line. The agreement provided also for the erection of a steel bridge over the Tiumen River to connect the Chinese and Korean systems, the cost of which was to be equally borne by the Chinese and Japanese governments. An advance of $10,000,000 was paid over to the Chinese government after the signing of the preliminary agreement.



The Banks of the Sungari River at Kirin. Huge Rafts of Logs are floated down from the Mountains to the South and East

The line is of great strategical and commercial importance to Japan, assuring to her another outlet for the raw products of northern Manchuria, and at the same time, strengthening her strategical position against a menace from the north.

The proposed line is 262 miles in length. Starting from Kirin, it passes through Tatun, Hsiakiang, Mifeng, Shuangchaho, Ohomuchan, Pataohotzu, Laoyehling, Takuchiatzu, Tachiaoho, Wulintun, Wulinkou, Chingling, Hsiaomachiatzu, Weihuling, Paotzukou, Pingfang, Chengchang, Choulitzukou, Peiweitzukou, Tunhua, Tungtuyaotzu, Tashitouho, Panchiaotzu, Haerhpa, Lingfengmichetzu, Liangchutai, Yushuchuan, Laotoukou, Shankuantaokou, Fungfassu, Tungkuantaokou, Chaoyangchuan, Lungchingtsun, Holunghsien, Huakushengling, etc. Most of the country is mountainous. The Sungari, Mutan and Tumen Rivers with their tributaries wind through this region, and their valleys contain fertile strips of land. Then, the zone marked with gentle undulations is mostly suited to cultivation and has plenty of room left for reclamation as the means of communication is developed.



General View of Kirin

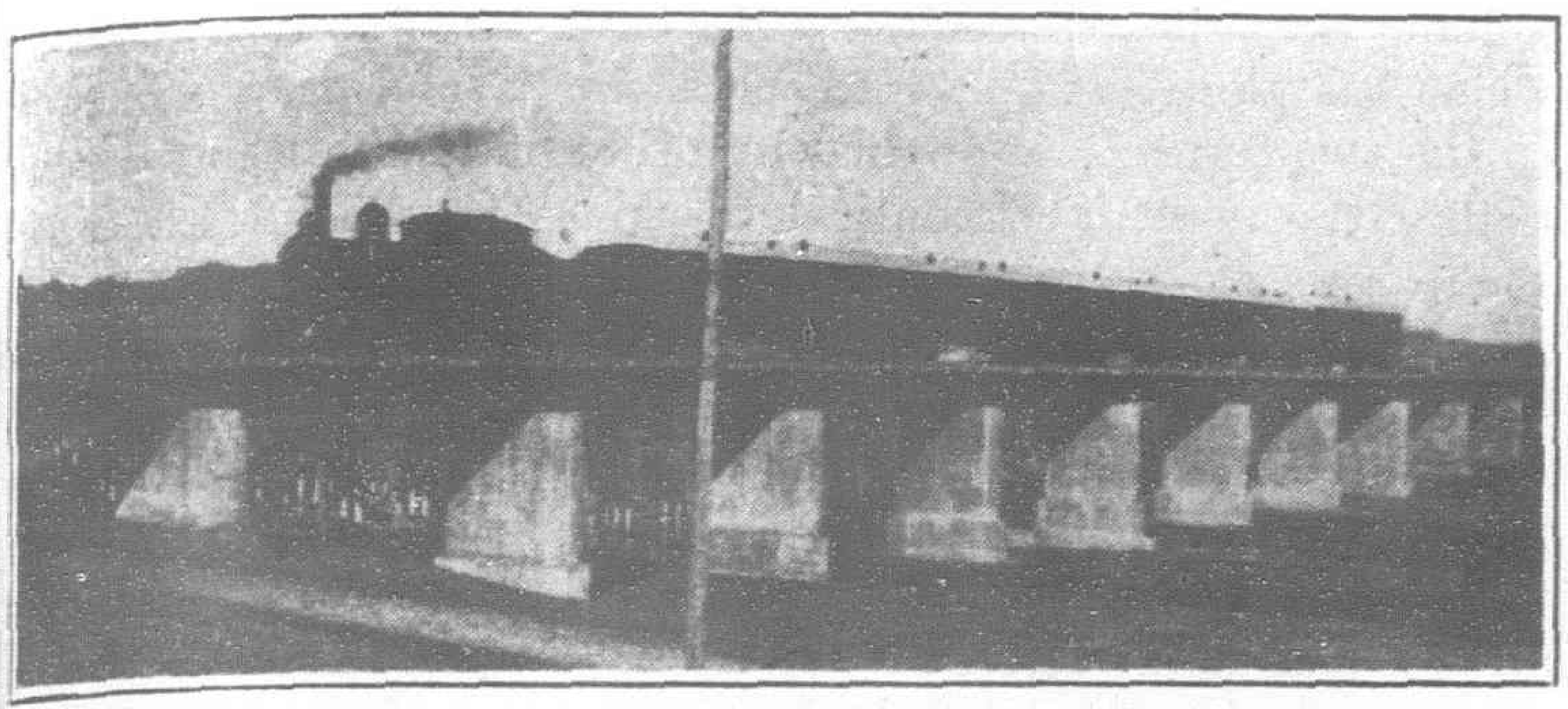
At present there are no means of communication and the territory is practically cut off from the outside world. Therefore few immigrants are attracted to this region. Moreover, it is surrounded with mountain ranges like high walls. Between Kirin and Omso and Tunhua, the two ranges of the Laoyehling and Changkwangtsailing run from northeast to southwest ; between Chosen Peninsula (Korea) and Chientao there rises the Huaku Range ; between Tunhua and Harbin there is the Paling Range ; and on the south the Lungkang Range and the Mutanling Range, spurs of the Paitoushan Range.

This region is sparsely populated, and has no native industries, there being only 1,200,000 *hsiang* (or 864,000,000 *tsubo*) of land under cultivation divided among the twelve prefectures of Kirin, Huatien, Mengkiang, Shulan, Panshih, Tunhua, Omso, Ningan, Yenchi, Holung, Wangtsin and Hunchun.

The projected Kirin-Kwainei Railway will enable the arable area to be doubled in a short space of time. Especially, the agricultural products from the Sungari Valley and the fertile region of Chientao, which are often called the "Granary of Manchuria" will be of enormous quantity.

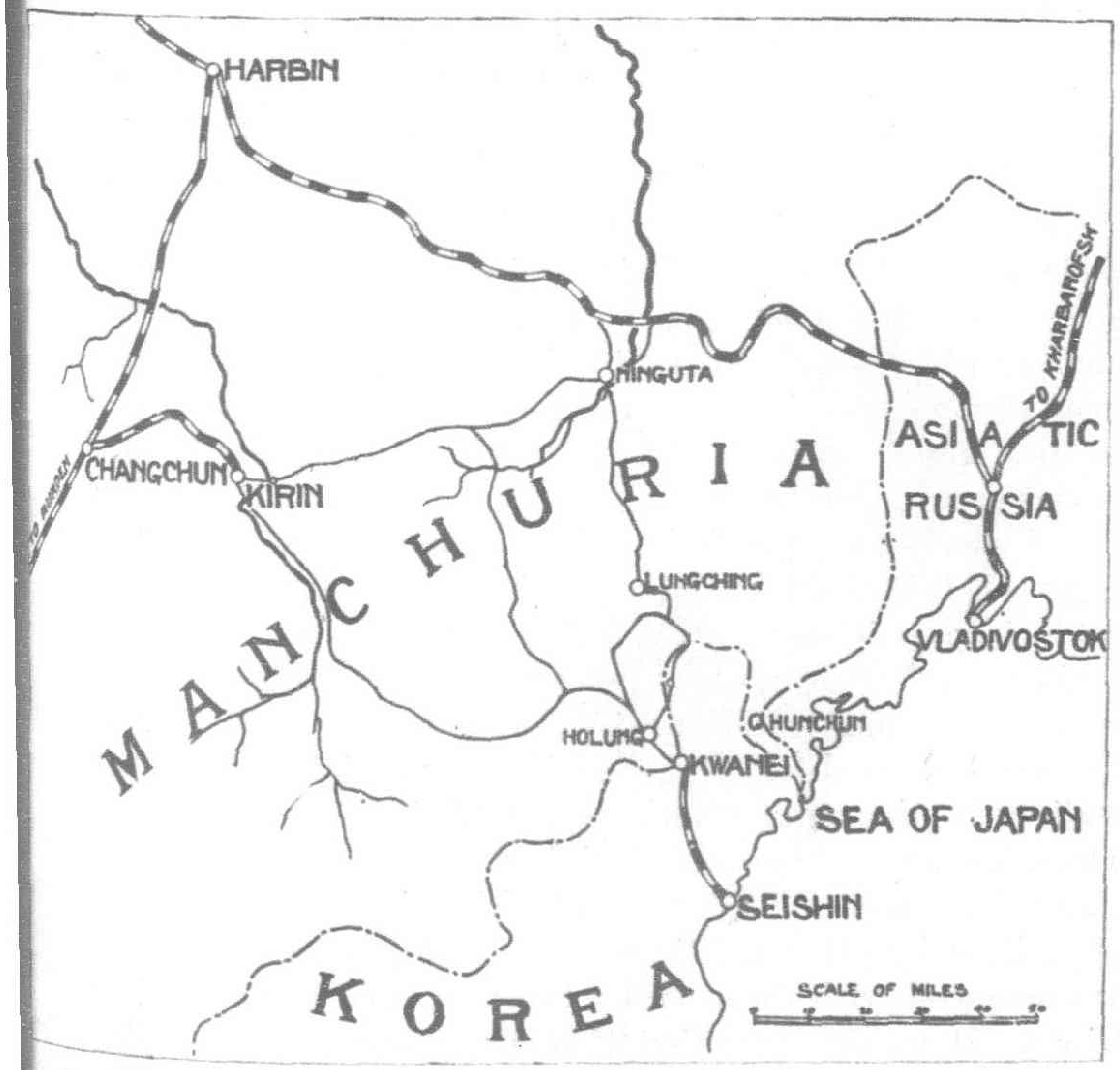
However, it is expected that the major portion of the traffic will consist of goods in transit from Changchun, to the Korean seaport of Seishin, rather than cargoes between intermediate points on the new line. For this reason, the products along the Harbin-Kwanchengtzu Section of the Chinese Eastern Railway and also the Kirin-Changchun Railway will be forwarded via the new railway for Japan, and as return freights, cotton yarn and cloth, together with sundries, will be brought for distribution to the district along the Kirin-Kwainei Railway.

The greatest value of the road, however, will be in the opening up of this fertile region to bean and wheat production, and providing homes for the overcrowded population of other parts of China. The region is also well adapted for cattle raising, containing many rich grazing plateaus. It would be mere speculation to hazard any estimate of the acreage and crop possibilities of this region, of which so little is known. A recent Chinese official report on the resources of Kirin province states that the coal mining districts of the province are located in Machiakow, Hoshihlintse, Chinyao, Lwannikow and Penshilin of Kirin; Shahotse and Meikaokow of Itung; Yinchiakow and Penchaiho of Shulan; Wutaokow and Szetaokow of Panshih; Futushan and Talintse of Pinhsien; Kwanmentsutse of Hunchun, Fuyikow of Tungning, and Lannikow of Omu. Unfortunately, modern mining methods are conspicuous only by their absence and primitive practices, coupled with the financial inexperience of the promoters, cause the failure of many companies. The capital of the companies varies from a thousand dollars to a hundred thousand dollars. The Tung Yuan Mining Company has a capital of $100,000 and is located at Machiachow. The Pao Chih Company at Hoshihlintse is maintained with a capital of Tls. 100,000. These are only undertakings which conduct their enterprises on a large scale and which have sufficient reserve funds. The former has an annual output of 6,500 tons and easily ranks as the highest-producing mine.



A Train on the Kirin-Changchun Line

There is little coal of superior quality in Kirin. Generally it is bituminous, soft, weak and of a dull appearance. It is slow in combustion and is unfit for steam purposes. Most of it is transported overland to the big towns or to the nearest railway stations. Kirin, Pinkiang and Changchun are the venues of concentration, the Kirin-Changchun and Chinese Eastern Railways being used in transportation.



The New Line Will Eventually Effect a Connection Between Kirin and Kwainei

Quality and locality have to be considered in arriving at the price of the coal. On an average it is: Kirin, $5.50 per ton, Changchun, $5.20 per ton, and Pinkiang, $5.70 per ton. There is little local demand—firewood is mainly used as fuel—and the low quality of the product and the high transportation charges militate against its export.

Steamer Launched at Kowloon Docks

A SUCCESSFUL launch of a new steamer took place recently from the shipbuilding ways of the Hongkong & Whampoa Dock Co.'s premises at Kowloon Docks.

The vessel, a sister ship to the *Hektor* which was launched last February, has been built to the order of Messrs. Brunsgaard Kiosterud & Co. of Drammen, Norway, and under the supervision of their Superintendent Captain Ivar Siqveland.

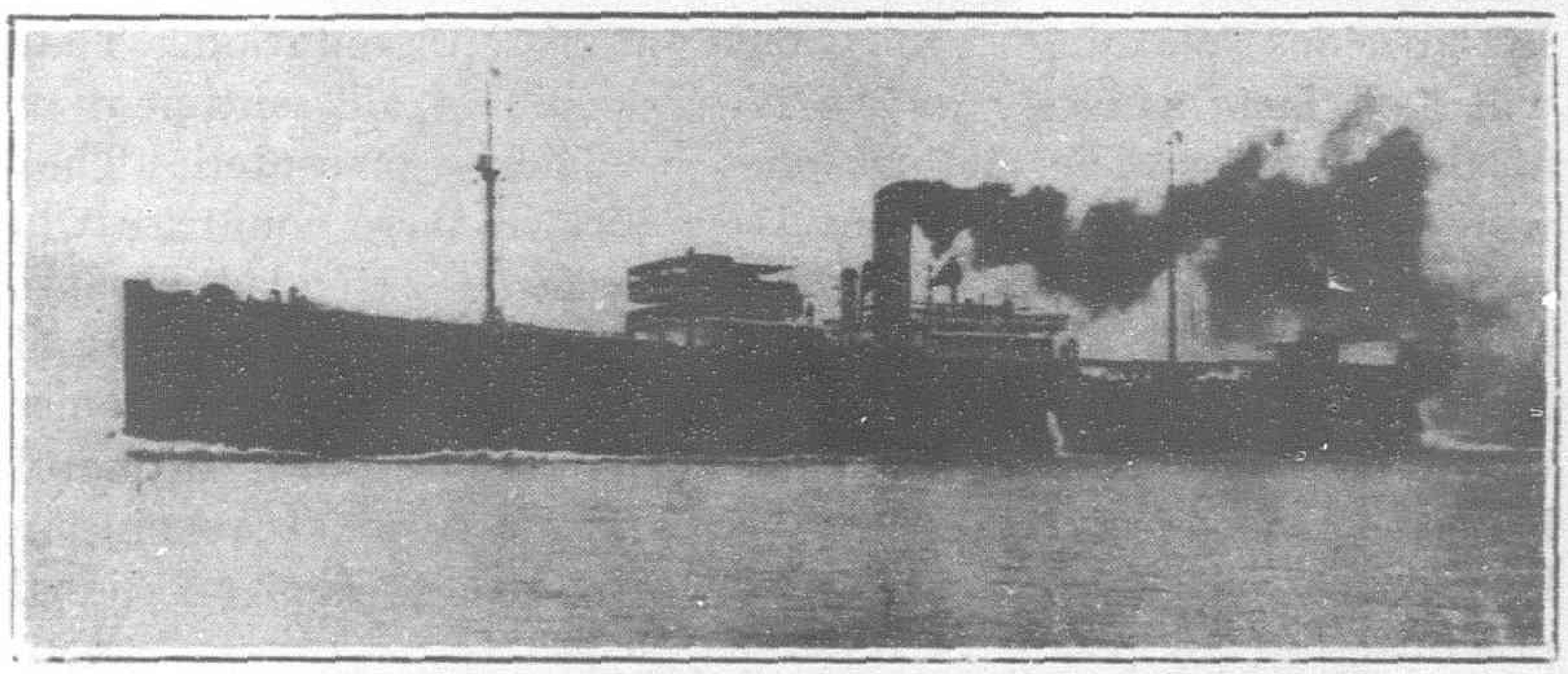
The launching ceremony was gracefully performed by Mrs. R. M. Dyer, the wife of the chief manager of the Hongkong & Whampoa Dock Co., Ltd., the vessel being christened *Hellen* as she left the ways.

After the ceremony the company adjourned to the offices of the Company where the usual toasts were honored.

The principal dimensions are as follows, viz.:—

Length between perpendiculars 400 feet, breadth moulded 52 feet, depth moulded to upper deck 31 feet, 'tween decks 8 feet, erections 7 feet 6 inches.

A total deadweight of 8,250 tons will be carried on a mean draft of 25 feet 6 inches, the speed loaded being eleven knots per hour.



The s.s. *Hektor*, sistership to the s.s. *Hellen*

Propelling machinery constructed by the builders is amidships and of 3,100 indicated horse-power, consisting of one set of triple-expansion surface-condensing engines having cylinders 27-44-73 inches diameter by 48 inches stroke, steam at 180-lbs. working pressure under forced draught being supplied by three cylindrical return-tube boilers of 15 feet 6 inches diameter by 11 feet 6 inches long.

The engine and boiler room outfit includes a Weir's D. C. heater and Weir's main feed pump, independent centrifugal circulating pump, also general service, ballast and condenser pumps.

Unusual in cargo steamers is the See's ash ejector and ash ejector pump installed for disposal of ashes from the stokehold.

The coal bunkers are of large capacity, and provision has been made for carrying oil fuel throughout the double bottom in accordance with Lloyd's requirements, the vessel having been specially surveyed during construction by Messrs. Gardiner and Morrison, local representatives for Lloyd's Register of Shipping.

The Far Eastern Review

A Monthly Review of Far Eastern Trade, Finance and Engineering, Dedicated to the Industrial Development and advancement of Trade in Far Eastern Countries

ENGINEERING FINANCE COMMERCE

5 JINKEE ROAD, SHANGHAI, CHINA

Telegraphic Address: Farview, Shanghai

SHANGHAI, AUGUST, 1921.

Democracy in Asia

THE Wood-Forbes mission to the Philippines and President Harding's call for a Pacific conference is an announcement to the world that the United States has awakened from its day-dreams to face the stern realities of a critical situation handed over by Wilsonian theorists for more practical Americans to solve. The two steps are correlated. The report and findings of the mission will serve as the basis of a program that will guide our delegates to the conference on Pacific matters and assist in the formulation of a definite American policy. It is a big job. It called for a big man. President Harding picked the biggest American, gave him as associate the foremost American expert on Philippine affairs, and let them pick their lieutenants. True to their record, General Wood selected Colonel Frank McCoy, and Governor Forbes called upon his old friend and assistant, Lt.-Col. Bowditch to form part of the mission. Both of these officers served as assistant chiefs of staff to General Pershing directing the work of G. H. Q. at Chaumont, under General Harbord, and then accompanied their chief on the Armenian mission. The quartette are trained observers with a full knowledge of the East gained from actual service on the ground. General Wood is a man of cool and calculated judgment with a clear grasp on the issues at stake. Neither he nor his assistants are men who can be led astray by specious pleading, propaganda or misrepresentation. They will look facts squarely in the face, devoid of all sentiment or ideals and base their findings on the evidence presented. They will visit China and Japan but their stay in these countries will partake more of the acceptance of courtesies extended because of their nationality and personal distinction. The problems of Asia are being unfolded to them from all angles and it becomes more and more evident that they are narrowing down to one of idealism *versus* materialism. America has arrived at a point in her international relations where she must either adopt a rational practical foreign policy in order to ensure the continued good-will of others, or, insist upon the application of ideals in Asiatic countries which encourage unrest, sedition and revolution.

The cherished American doctrine that all men are created equal, that all government shall proceed from the governed, that the proclamation of a republic is evidence of the fitness of a people however backward, to govern themselves and enter the family of nations, must be squarely faced from the practical political viewpoint.

Can the Filipinos govern themselves ? Have they, in twenty years of American tutelage, reached that high state of political development that will enable them to paddle their own canoe in these stormy seas of Asiatic politics ? This question is part of a greater one. On its answer depends whether there is to be internal peace in Asia, or, continued unrest and revolution. In seeking for the answer the mission cannot escape facing the similar problem involved in the ability of the Chinese to successfully maintain a republican form of government, and from this, turn their attention to the clamor of the people of India for autonomy, for independence. These problems are all correlated and should be considered as a whole in fixing American policy in Asia.

Americans were the first to welcome the Chinese republic into the family of self-governing democracies. American writers and constitutional experts insist that the Chinese are the original democrats, peculiarly fitted and adapted to manage their own affairs. This laudable attempt to extend democratic ideals throughout the world by giving moral support to every people who proclaim a republic must naturally meet with the opposition of other nations holding opposite viewpoints. Much of the unrest and intrigue which has plunged China into successive revolutions can be traced to the steady pressure applied by other nations to counteract and nullify the spread of political doctrines in Asia which menace their own security.

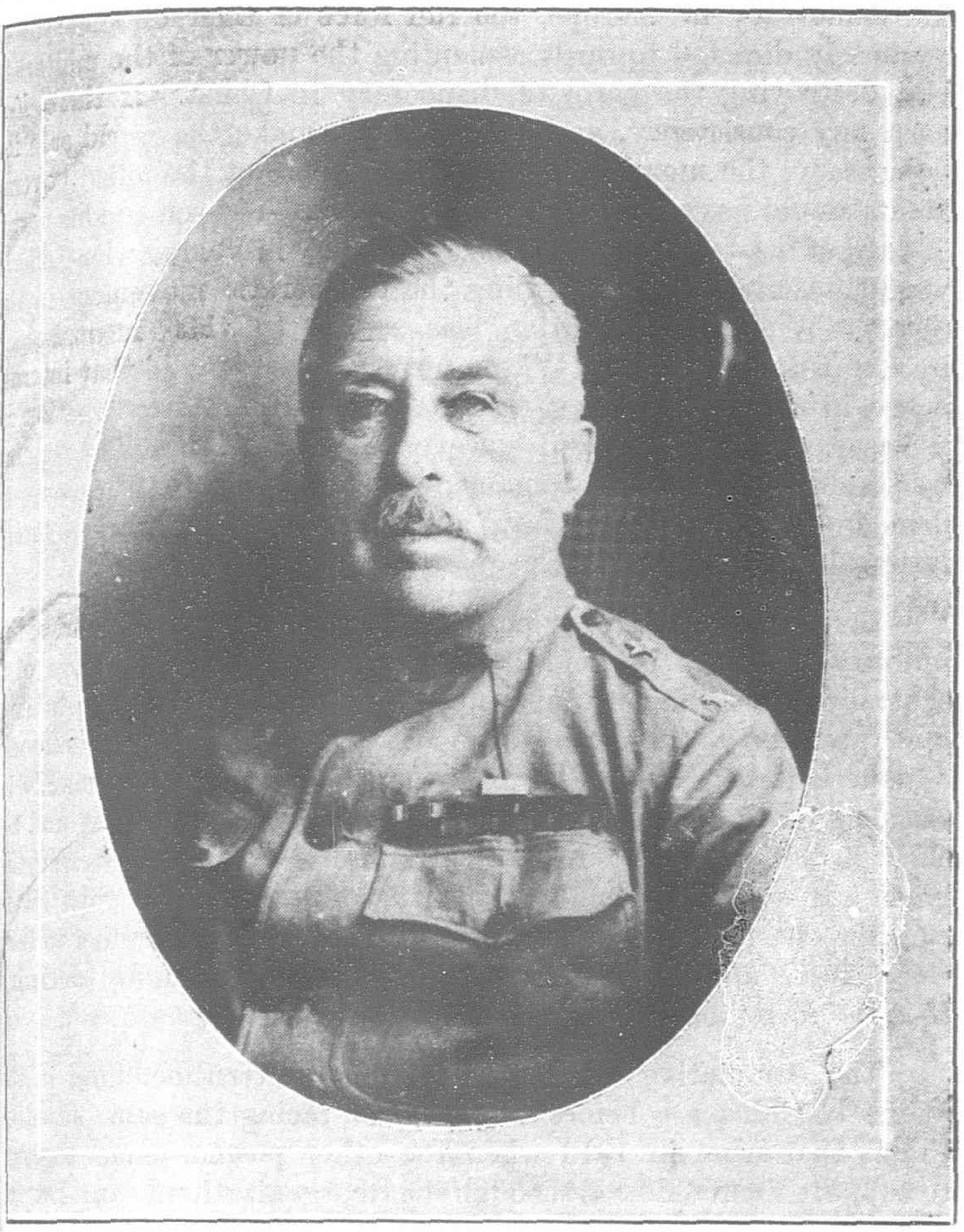
If we admit that the 400,000,000 Chinese, steeped in the traditions of their past, inexperienced in the ways of modern government, have arrived, over-night as it were, to that point where they are now competent to exercise the right of suffrage and manage their own affairs under a republic, with all that this implies, what answer can Great Britain make to the 350,000,000 Hindoes when they clamor for autonomy ?

If the Chinese, without previous political experience or preparation in self-government are accepted without question into the democratic family, their cause ardently championed by American professors and high salaried advisers, what answer can America make to the Filipinos when, after twenty years of direct supervision, they insist upon their ability to govern themselves and demand independence forthwith ? If we admit that the Chinese are fitted to run a republic, must we not in all fairness extend the principle to the Hindoo, to the Filipino, to the Korean and other Asiatics ? Great Britain justifies her policy in India on the political backwardness of the Hindoo, necessitating a long period of training before they can be entrusted with full autonomy. The present governor-general of Korea recently stated that the ballot cannot with safety be extended to the Koreans ; in other words, the identical reasons put forward by America to justify our policies in the Philippines. If the United States now declares that in twenty years the Filipino has been raised to the level of the Anglo-Saxon and is competent to govern himself, Great Britain and Japan must either acknowledge the inferiority of their methods, or, what is more likely, condemn the American action as too hasty.

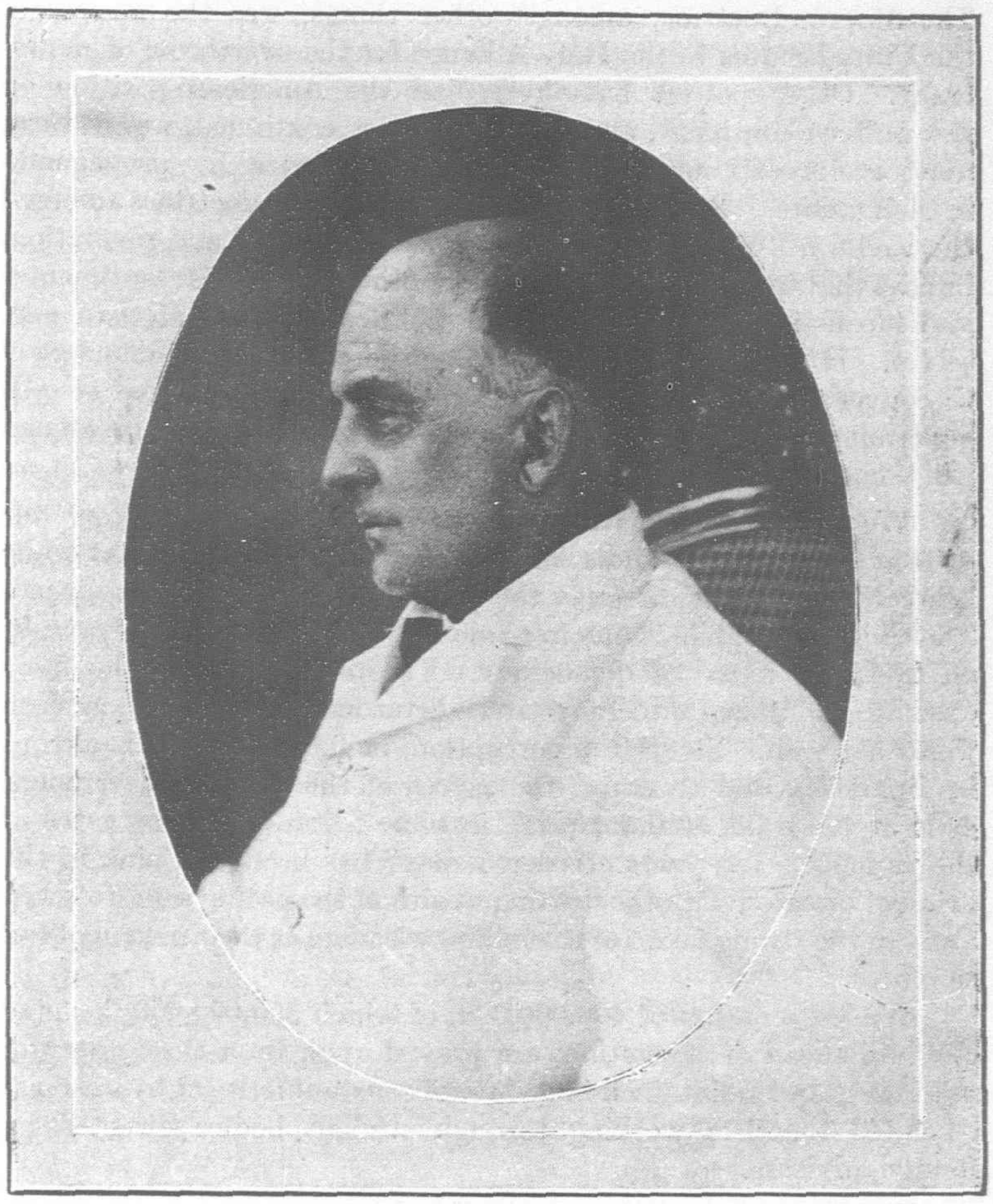
These are phases of the Far Eastern problem that should be seriously considered in connection with the investigation of the Wood-Forbes mission. Sentiment should give way to reality in answering the question: "Have the Asiatic people arrived at that stage where they are competent to manage their own affairs ? Have they, in a few years of tutelage without sacrifice on their part, attained to the political level of the Anglo-Saxon with his thousand years of progress behind him" ? The question is timely and pertinent, for, if the Chinese have reached that point, there is no good reason why America should refuse independence to the Philippines. If, on the other hand, they have not yet demonstrated their ability to manage their affairs under a republican form of government, we must then be prepared to throw overboard sentiment and ideals and co-operate with other nations for the establishment of some acceptable form of government that will bring stability to the Chinese nation and put an end to international squabbling in this part of the world.

A successful republic in China became a menace to the existing order of things in all other Asiatic countries at the time it came into existence. Her neighbors were opposed to the too rapid spread of democracy amongst peoples unfitted by centuries of training and traditions to manage their own affairs. Even the much abused old empress-dowager and the Manchu princes realized the danger of granting a constitution to the Chinese without a long preparatory period of training. It is easy, therefore, to understand that any self-government drive in Asia must meet with opposition by other politically practical powers whose possessions are menaced with disorder by the too rapid spread of these doctrines. It would seem that if order, peace and prosperity are to prevail in Asia, then some common understanding between the powers is necessary for the recognition of each other's problems.

THE WOOD-FORBES MISSION



Major-General Leonard Wood



Hon. W. Cameron Forbes

Colonel R. Frank McCoy

Lieut.-Col. Peter Bowditch

Both of these officers served as assistant chiefs-of-staff under General Harbord at G.H.Q., in Chaumont, and afterwards formed part of the mission which reported on conditions in Armenia and Asia Minor. They are trained observers peculiarly fitted by character and experience for the work on which they are now engaged.

Americans resent the spread of Bolshevist and other doctrines subversive of their ideals of government in their own country. The Monroe Doctrine, amongst other things, was the answer of the United States to the Holy Alliance for the overthrow of democracy. Other powers have respected the American position on the western continent, and if this is to be continued, we, in turn, must reciprocate and refrain from interference by propaganda in their affairs. To insist upon the right to spread doctrines amongst the backward peoples of Asia that make for unrest and revolution, implies that we are creating trouble for other powers less sentimental and idealistic but eminently more politically practical than ourselves. If Americans are in Asia as missionaries of democracy to convert and lead the Asiatic forward towards the goal of self-government, then other nations whose interests are threatened will come together to oppose them.

We have but to gaze upon the picture unfolded before our eyes in China, Korea, India and the Philippines to sense that while headed in the right direction the process of evolution is too rapid. The Chinese republic is one in name only. It is a farce, a travesty on the good name of democracy. The picture reveals the most absolute military autocracy and dictatorship that the modern world has seen. Steeped in corruption, inefficient, weak, bankrupt in diplomacy and treasury, the power of the Peking government ends at the walls of the capital, in some instances at the gates of the yamêns. Ten years of "democracy" has brought China to the brink of disaster, with the floating wealth of the nation safely stowed away in the strong boxes of the military leaders or their metropolitan satellites.

We see a nation of 400,000,000, of which 390,000,000, keeping one hop ahead of starvation, are preyed upon by a close group of militarists and maintained in a state of constant ferment by western-educated theorists working through student bodies directed by foreign advisers.

The extension of democratic ideals and manner of thought to a handful of Chinese has converted this once contented and united people into a warring jangling mass of sectional political fanatics, led by student politicians, vociferating about the rights of man, universal suffrage, democracy and other catchwords pleasing to the ear of the masses. Democracy in China is the cloak under cover of which the handful of agitators hope to gain the support, sympathy and dollars of the sentimental American, and take over the lucrative jobs now held by the military satraps.

Powerless to overthrow the Peking military government by force of arms, devoid of that spirit which should cause them to rally around the flag of Sun Yat-sen, this element now proposes to the powers the withdrawal of diplomatic recognition from the Peking government and extension of support to the student and commercial bodies who have succeeded thus far through publicity in posing as organized public opinion.

This, however, is only one side of the Chinese picture. The country is split asunder by the Yangtze into two halves, north and south, with two presidents, two cabinets and various independent or semi-independent sections awaiting to see which side offers the greatest inducement in return for their allegiance. The northern government at Peking is a puppet show manipulated by Chang Tso-lin, the tuchun of Manchuria, and deriving its prestige from diplomatic recognition of the powers. There is nothing democratic, republican or sentimental about this show. It is autocracy, militarism run mad. It represents the inevitable outcome of good intentions meddling with the affairs of China, and goes back to the time when the celebrated "Flying Wedge" induced President Li Yuan-hung, under threat of civil war in the Yangtze, to sever diplomatic relations with Germany. The militarists saw their opportunity to consolidate their hold upon the country through the medium of the vast war loans that were expected to come from the United States. The parliamentary party likewise recognized the danger to democracy in China involved in entering the war against Germany under such conditions, and revolted. The picture presented to the world in China during the progress of the great war revealed that while the allies were responding to the call to put an end to militarism and make the world safe for democracy in Europe, the full force of their diplomacy was seemingly directed towards cementing the power of the militarists and destroying the germ of democracy in China. If there had been any consistency, any real effort to make the world safe for democracy, the moral and material support of the allied governments would have been extended to Dr. Sun Yat-sen and his party, instead of bolstering up a military oligarchy in Peking whose efforts were concentrated in throttling the democratic movement in the South. When his attention was called to this inconsistency by the writer, President Wilson notified President Li that internal peace in China was more essential than direct participation in the war. The admonition, however, came too late. The country was split asunder and remains so to this day. The cause of democracy in China was lost, and a predatory militarism firmly fastened upon the Chinese people.

In the meantime, other powers contributed to the support of the military oligarchy in Peking as holding out the only hope of a centralized government that would restore order and bring stability and prosperity to the country. Japan, for military reasons, advanced large sums to Peking, which were employed mainly in carrying on campaigns to crush the South. Sun Yat-sen and his chief lieutenants, who revolted originally to avoid entering the great war under the leadership of the military party (thus incurring the charge of being pro-German) saw the opportunity to shift their front, and justify their continued opposition by declaring that the North had sold out to Japan.

The cumulative effects of years of Western meddling in the affairs of China are before us. We are facing the same situation to-day that arose in 1913 when the other powers came together to support Yuan Shih-kai through the Reorganization Loan. Despite the opposition of President Wilson and the withdrawal of the American group from the China consortium, the loan was made and Yuan firmly seated in power as the dictator of China. His first act was to dissolve the parliament and hound its members to prison, exile or death. Other nations would prefer to see in China some strong authority that will guarantee law and order, protect investments, promote trade and work in harmony with their own ideas of what is best for the Asiatic in the matter of self-government. The too rapid spread of democracy in Asia can only operate against the best interests of these powers. They will pay for the mistakes of sentimental and impractical meddlers in the affairs of China. Their interests should, therefore, be considered and respected, if any lasting understanding is to come out of the Pacific conference.

The conflict of ideals in China which has so far resulted in perpetuating military rule in Peking has had the effect of drawing together in sympathetic understanding the various so-called democratic elements throughout Asia, and we find a marked tendency on the part of Hindoo, Filipino and Korean independence leaders to look up to Dr. Sun Yat-sen as the great champion of their cause. The desertion of this Chinese leader by Americans and British and the severance of his friendly relations with Japan has had the effect of making him a popular idol in other Asiatic countries. Throughout the villages of Bengal, his photos are, I am told, found by the thousands decorating the walls of the most humble dwellings, are worshipped by the Hindoos as a god. The British authorities view with increased concern the rapid spread of the independence movement in India, in which practices, such as the boycott, student agitations and other methods imported from China, are employed in the campaign to frighten the British government into conceding their demands. Little did the foreigner in China realize when applauding the anti-Japanese boycott a year ago, that the example would so soon be followed by the independence party in India. This helps to explain an attitude which inclines to the belief that the establishment of a strong central rule at Peking under whose direction the masses can be led gradually along paths of political development that will fit them in time to exercise control over their own affairs under some system of constitutional government, is the best for China.

We have arrived at the point where a common meeting ground must be found in order that the interested powers may agree amongst themselves as to the form of government they will unite to support in China. The present situation cannot be permitted to drag along indefinitely without inviting recurrences of soldier outbreaks, or worse, that in the end will paralyze all trade and industrial development. True, the powers, acting through the consortium, can adhere to their present wise policy of non-intervention and withhold financial support until the Chinese agree as to their permanent form of government. But conditions have arisen which may force their hand in this matter, compelling them in self-interest to unite in a definite policy on this particular point. It is only necessary to point to the forthcoming Pacific conference called for November, to realize that any agreement between the powers as to their future policy in the Far East must be based upon a united China under some form of government that will permit this nation to assume its full share of the responsibilities for the maintenance of peace in Asia. Unless China appears before the conference united, and with some settled program, there can be no lasting result. The question, therefore, arises: Are the powers prepared to recognize and support financially the present military oligarchy at Peking, or, will they go to the other extreme and back the southern or parliamentary party?

It is admitted by all impartial observers that neither side can impose its will upon the other unless furnished with the sinews of war in the way of loans, arms and munitions.

The hope that either side can hold out without funds long enough for the other to surrender must be abandoned. The situation is too loaded with dynamite for the outside powers to sit quietly on the side lines and wait another decade for the Chinese to muddle through. Dr. Sun Yat-sen, at least, recognizes that there is no time to lose, and, after defeating Lu Yung-ting in Kwangsi, he proposes to declare open war upon Peking and entertains the hope of eventually marching northwards with his conquering army and settling scores with Chang Tso-lin and the other war-lords opposed to the establishment of a parliamentary government. Dr. Sun is on the war path, and can be depended upon to push his victories as far as his slender resources will permit. Whether one approves of Dr. Sun or otherwise, there can be no question as to the remarkable advances made under his direction of affairs in Canton. Graft may still exist in Kwangtung, but if it does, it is reduced to a minimum. Extravagance has given place to economy, with everybody working together for the attainment of their ideal. After a visit to the medal-bedecked tuchuns of the North, it is a relief to enter the presidential office at Canton, and be received by a quiet modest gentleman, dressed in the plainest of civilian clothes surrounded by evidences of a most democratic and unostentatious taste. Dr. Sun may be impractical, he may be a dreamer, he may be inclined to socialism, but he is a patriot and an honest man. It is difficult at this time to oppose a national leader because he is considered idealistic or socialistic in his views. It will be many years before the principal nations of the world are ruled again by such idealists as Wilson or semi-socialists like Lloyd George. They were, however, honest. The people believed in them. Likewise Dr. Sun Yat-sen is honest and the people of China, the 390,000,000 human beings keeping that one hop ahead of starvation, look up to him as their savior. This is the strength of Dr. Sun. The military leaders and politicians of Peking realize this and dare not proscribe him. Dr. Sun glories in the fact that he is a man of the people, son of a coolie. He has cleaned up, beautified and improved Canton within the limitations of the funds at his command. His son, Mr. Sun-fu, a graduate of the University of California, is the mayor of the city and takes a personal interest in seeing that reforms are carried out. The people of Canton, irrespective of party, are proud of Dr. Sun Yat-sen. They are with him, believe in him and will stick to him. He stands alone in all China, the one ruler who holds the real affection and loyalty of his people.

"If the powers are seeking to establish a strong central government in China, along lines that will permit the people in time to take their place in the world of democracy, why should they not give me their support" says Dr. Sun. "The militarists," he added, "rule by force and crush the people through taxation and maintain the country in a constant state of warfare to further their own ambitions. The people love me and will be guided by my advice. If you want a strong government, get behind and support me and I will give it to you, and it will be an honest one," said Doctor Sun to me in a recent interview. And I, who had held his power-of-attorney to finance the railways he was authorized to construct, realized that Dr. Sun spoke the truth.

I wish to digress to tell a story. In 1912, I was invited by Dr. Sun to take over the duties of technical secretary to the Chinese National Railway Corporation, which held the mandate from President Yuan to devise a national system of railways, organize a company and negotiate with foreign bankers for their financing and construction. I was finally given full powers to proceed abroad and conduct the preliminary negotiations with the bankers. On saying good-bye to Dr. Sun at his house, I called him into his private library, and said: "I am leaving on this important mission without any definite instructions from you, and I would like to know here in private just what you expect me to do in the matter of commissions. Do you want any sums set aside for you or the corporation in any terms that might be negotiated"? Looking me squarely in the eye, he replied, "I expect you to obtain the lowest terms that you can for my country. I do not want one cent set aside for myself or any member of this corporation." And stretching out his hand, he said," Good-bye. I place my honor in your hands."

Dr. Sun Yat-sen is entitled to this breach of confidence on my part, made necessary by the vicious campaign waged by political enemies to discredit him. To me, he will always remain a true patriot, who, despite his faults, would probably make a most excellent president of China.

He is a man of ideals. When President Wilson withdrew his support to the American group in 1913, and thereby destroyed the possibility of financing his railway scheme, ruining his chances of accomplishing anything in this line, at his request, I personally visited the White House and thanked President Wilson for and on his behalf for adherence to principles that defended the ideal of democracy in China. Dr. Sun saw his pet scheme destroyed, yet he was man enough to swallow his defeat and rejoice in the attitude of President Wilson which preserved his greater ideal from the menace involved in handing over to Yuan Shih-kai the millions that he sensed would be utilized in hounding the parliamentarians into exile.

If the powers unite to support a limited republican form of government in China that would educate the people gradually to a fuller conception of their responsibilities, Dr. Sun Yat-sen is entitled to all just consideration. The republic was his work. He stepped aside and surrendered his hope of reward in 1912 and acknowledged Yuan as president in order to bring peace to his people. He refused to bring further bloodshed and suffering on the nation in order that he might personally benefit. His renunciation of the presidency at the zenith of his popularity and power stands unparalleled in modern history as an example of self-sacrifice. His solicitude for the people is better told by repeating what his wife once confided to me. She said: "I do not know how we can get along and make ends meet at home. "Father" allows us . . . (a modest sum) for household expenses, but every old soldier who fought with or for him at Nanking and is now in hard luck, and every soldier's widow who needs help, all come here for assistance, and father never turns them away. They all get something, and by the end of the month, we are always in debt for the household expenses." This is the real picture of Dr. Sun Yat-sen, a man's man, worthy of the highest respect and confidence.

Unfortunately, his many enemies have steadily and skilfully undermined his reputation by malicious slander and questionable propaganda, and there now seems little hope that he will be permitted to attain any prominence in the final adjustment of the Chinese puzzle that he does not impose by the force of arms.

The conflict in China is not only one between North and South, the military against the parliament, but one with all the earmarks of the monarchy against the republic. The final decision as to the nature of a permanent government in China may be made by the northern militarists proclaiming a restoration of the monarchy, with the forces of Chang Tso-lin and Tsao Kun standing behind the little emperor Dr. Sun Yat-sen declares that he will, in time, come North and crush Marshal Chang, who, he alleges, is in the pay of Japan and conspiring to overthrow the republic. There is little doubt that Chang is friendly to Japan. He has good reason to be, for apart from any accusation of being in Japan's pay, he derives his great prestige from a province made immensely prosperous by Japanese enterprise, a never-ending source of revenue which enables him to pay his army and dominate the government. If Dr. Sun's information is correct, we would have another complication tending to postpone unification of the country, under a republican form of government and make more urgent a common understanding on the part of all the powers as to what form of government they will support. It seems hardly probable that any solution can be arrived at before the opening of the Pacific conference in November, and the powers, once more, as at Paris, must deal with the representative of a divided China.

Just to complicate matters a little more, reports from Tokyo now state that, if China attempts to bring up the Shantung question at the Pacific conference, Japan will at once insist upon the unification of China, or, recognize the Southern republic. If this report is true, we have here a possible solution to a situation that would relieve Japan from all charges of imperialistic designs upon China, force America and Great Britain to declare themselves on the issue of democracy in Asia, and compel young China to come out into the open. If Japan should take the lead in recognizing the South, the United States would be hard pushed to find reasons why it should not promptly follow.

This might, after all, be the best solution to the difficult problem of China, at least, the powers would then be dealing with an honest president who they could well afford to back financially. We are inclined to believe, that Dr. Sun as president of China, would not hesitate to take drastic measures in order to enforce honesty in the handling of public moneys.

There are more reasons than one why such a solution might be the key to Pacific peace and do more towards bringing about a good understanding between Japan and America than anything else. It has long been evident that the tension between Japan and the United States is maintained by propaganda emanating from and paid for by Peking. Recognition of the South by Japan might be one way to bring about a termination of these pernicious activities, which, if persisted in, must continue to widen the breach between Japan and America. There is food for much thought, from the American point of view, in this solution.

It is a foregone conclusion, however, that such a solution will be bitterly opposed by other elements in China as inimical to their interests, and especially by the "old Guard" in North China who stand in a solid phalanx defending the government at Peking. If, however, Dr. Sun could provide satisfactory guarantees to the other powers that he would go slow and educate the Chinese people gradually in the ways of self-government and so contribute to decreasing the tension in other parts of Asia, there seems no good reason, why, under proper guidance, Dr. Sun would not make an acceptable ruler to all interested powers.

It goes without saying, that if matters are permitted to drift, the powers, sooner or later, will be faced with a crisis that will compel them to take decisive action. The North seems to lack a competent leader. The South is swinging around solidly in favor of Dr. Sun, and if Peking is determined to keep Japan in a constant state of international unrest, and the latter in self-defense recognizes the Southern republic, then the world will have to face stern realities and follow her lead. Viewed dispassionately, and with all due allowance for the opposition of other interests, such a solution would promptly terminate many questions that now serve as a source of irritation between Japan and America, and bring these two peoples closer together for the maintenance of Pacific peace.

A radical change has come over Japan in the past year. Each day, each month sees the ascendency of the liberal element in that country. The Japanese people are now convinced that the military party stands between them and the good opinion of the rest of the world; militarism in Japan is giving way to liberalism, to democracy, and once these sensible people fully understand that this road leads to full harmony and co-operation with their great American neighbor, and make for a permanent peace in the Pacific, we can expect them to work with America for the establishment of a similar government in China.

And here perhaps, we have the Japanese answer to the opposition to the renewal of the Anglo-Japanese alliance, her move to perpetuate peaceful relations with the United States. If Japan recognizes the South, and stands ready to support it against the North, the American people will see in this positive proof of the good-faith of the Japanese liberals, and the government at Washington would be compelled to follow her lead. Such a move would firmly establish Japan's position as the friend of China and take the ground from under the opposition of the students and other bodies who have been accusing her of aggression.

G. B. R.

* * *

Sun Yat-sen: An Appreciation

UNFORTUNATELY for Dr. Sun Yat-sen he seems to have incurred the deep hostility of elements in China which cannot be altogether explained away by the favorite charge that he is a dreamer, impractical, and socialistic in his views. Such charges might have been sufficient to discredit him ten years ago. To-day they lack force. This antagonism is strikingly set forth in a letter written by Mr. G. Woodhead, editor of the *Peking and Tientsin Times* to the *Morning Post* (June 8), in which he protests against the undue prominence given to the election of Dr. Sun as "president" of China by the "so-called parliament," and concludes by saying:

> "Sun Yat-sen has still a certain following among the political agitators in China, but he has never given evidence of the least constructive ability. The 1911 revolution was virtually over before he reached China, and he had little or nothing to do with it. Under the republic his most notorious recommendations have been a scheme for the conquest of Russia (in 1913) and proposals for reorganizing Chinese currency by the unlimited issue of inconvertible paper notes."

The first sentence is an intentional slight, written by a journalist who edits the *China Year Book* and who should be thoroughly familiar with Dr. Sun's constructive scheme for a national system of Chinese railways, a scheme which Sir Charles Addis, the head of the British group, was willing to take over entire, and which was defeated by President Wilson's withdrawal of support to the American group. It ungenerously ignores the fact that as a result, British interests were the sole beneficiary of Dr. Sun's scheme, bringing to them the Pauling contract for 1,000 miles of railway. It is a reflection on the character of Dr. Sun, in ignoring the great truth that this one contract is recognized by every banker and railway constructor in the world, as embracing the most favorable terms ever conceded by international finance to a foreign government. Mr. Woodhead derides Dr. Sun's scheme for "the conquest of Russia" in 1913, in reality, one for the recovery of Mongolia which had been boldly annexed by Russia the year previous. Impractical perhaps, but highly patriotic and commendable, proving that Dr. Sun was a man of spirit at least. There have been too many military *fiascos* since that date, for Mr. Woodhead to advance this argument in order to discredit Dr. Sun. His currency scheme, designed largely to finance the above campaign, *was the one project* that Dr. Sun made public over the protests of his associates, and brought upon him the criticism which has since served as the basis of the campaign to discredit his ability.

Mr. Woodhead has been consistently unjust to Dr. Sun, and in his *China Year Book*, which goes out to the world as the authority on things Chinese, ignores all mention of the Chinese National Railway Corporation and its constructive work which brought a thousand miles of new railway contract to British interests. Dr. Sun's great mistake consisted in engaging an American adviser, which Mr. Woodhead and his friends have never forgiven him for. DR. SUN YAT-SEN IS POSSESSED OF THE HIGHEST CONSTRUCTIVE ABILITY, AND, WHEN ENTRUSTED WITH THE WORKING OUT OF HIS SCHEMES, SECURED FOR HIS COUNTRY THE MOST FAVORABLE TERMS EVER CONCEDED TO A FOREIGN GOVERNMENT BY BRITISH FINANCIERS. IN EVERY RESPECT HE CONDUCTED HIMSELF AS A HIGH-MINDED PATRIOT AND AN HONEST MAN.

Dr. Sun Yat-sen

An Honest Man, a Chinese Patriot. He Represents the Type that Must Lead China Forward to Her Place Amongst the Nations. Somewhat of an Idealist with Socialist Tendencies, He Stands for the Great Principle of Democracy or Parliamentary Government, as Opposed to the Grafting Rule of the Military Satraps, who Stole from Him the Fruits of His Work in the First Revolution. His great work for the Nationalization of China's Railways, was Destroyed by President Wilson in 1913, through withdrawing support from the American Group, at a time when his scheme was ready to be financed. He has recently been elected President of China by the Southern parliament at Canton. One of the anomolies of the Far Eastern situation lies in the fact that the Democratic Governments who fought Germany to abolish militarism, stubbornly uphold the worst type of predatory militarism in China, while opposing recognition to the leader of Chinese Democracy.

Civilization owes much to its dreamers. Dr. Sun dreams of mines and smelters, of factories, cities, ports and fleets, of railways and fields of grain, of houses and happiness. He dreams of a new China, the China of the engineer, the China that every foreign merchant, every foreign manufacturer, every foreign financier is hoping to see. He dreams of the China that is painted in such glowing colors by commercial attachés, consuls, diplomats, bankers, writers and others who see the immense latent possibilities awaiting the vitalizing influence of good government; the China that the consortium was organized to create and support, the China the world will be invited to invest in. He dreams of the China, that is impossible under further domination by military grafters and their sycophants. If the foreigner is in China for legitimate business and not for politics, there is more hope of his success under the rule of Dr. Sun Yat-sen than under any continuation of the farce upheld by the powers at Peking. If, on the other hand, the foreigner is in China for the propagation of ideals, if he desires to see these eminently practical people led safely along paths that will fit them for self-government, no one is more capable of doing this than the dreamer who for years labored for the realization of his dream as few men in the history of the world have labored for the attainment of their ideal.

Dr. Sun is human. He has his faults. He has made many mistakes. He has been unfortunate in selecting friends who used him at the height of his popularity as a stepping stone to office or notoriety, and then betrayed, maligned and ridiculed him. Proscribed, exiled, hounded from pillar to post, first by the Manchus and then by Yuan and the northern militarists, his life has certainly not been a bed of roses. The crime of Dr. Sun Yat-sen in the eyes of the militarists and all who receive favors from their hands, is not that he is a dreamer, but his emphatic refusal to accept any compromise or acquiesce in any settlement which fails to admit the triumph of democracy, in refusing to submit to any terms which will perpetuate the rule of autocracy and consolidate a system which in a few months would again turn against him and undo the patient work of years. The worst enemies of Dr. Sun are the jackals of autocracy, the hirelings of the militarists, the half-baked crew of so-called republicans who deserted him to take office under Peking.

Whether we wish to admit or not, the stern realities of the situation compel us to see that Canton is each day looming larger and larger as the determining factor in the long-drawn out struggle in China. It is blazing the way for the suppression of autocracy, fighting against great odds for the realization of the dream for some form of constitutional government at Peking.

G. B. R.

An American Triangle in Asia

THE American people have just cause to feel pride and satisfaction in their president's selections for the diplomatic posts at Tokyo and Peking, and with the arrival of Col. Charles B. Warren in Japan and Dr. Jacob Gould Schurman in China, it remains only for President Harding to nominate Major-General Leonard Wood as governor-general of the Philippines in order to complete the triangle and make certain co-operation and co-ordination of policies in this part of the world that will adequately advance national interests. If some arrangement could be made whereby these three American representatives could work in full understanding it would not take long to overcome the ground lost in the past eight years of clashing activities on the part of our representatives in the Far East. Give us a policy that we can live up to, that we can work for, and expect to see perpetuated, and there will be no great difficulty in welding together into one harmonious whole the various discordant American interests now fighting each other all over the Far East. Give us an American program, one that will make for peace, harmony and concord in the Pacific, cut the *laison* with Peking, come out in the open with Tokyo, and then leave it to the Triangle to see that Americans are brought together for the sole advancement of national interests. If one group of Americans in China are to encourage an agitation that reacts upon the interests of other equally good and patriotic Americans in Japan and holds back the development of the Philippines, then there can be little hope for building up American trade and prestige in this part of the world.

What we heed in the Far East more than any thing else, is some program that will unite Americans in China, Japan and the Philippines, with consideration for each other's problems, and not a continuation of a petty, selfish, one-sided attitude, which attempts to penalize those who see things in a different light. It needs strength of character and leadership in a high degree to weld these discordant parts together, but it can be done with a proper policy, under the direction of such leaders as Wood, Warren and Schurman.

Schooled in great affairs, accustomed to responsibility, intimately acquainted and associated with prominent individuals of other nations for many years, the three new directors of American policies in Asia have much in common. Wood with his great executive ability, magnetism, cool judgement and general all-round fitness to administer, seated in his palace on the banks of the Pasig, should be the head of American policies in Asia, in constant touch with all developments.

Warren in Japan will be at the critical point of the other triangle made by Washington, London and Tokyo, the field manager of the most delicate international problem in the most agitated *foci* of world diplomacy as it affects the United States. He has had ample schooling, and as associate counsel in the celebrated Bering Sea case before an international high commission, and as counsel for the United States in 1910 in the North Atlantic fisheries case before the newly organized Hague tribunal, he earned the praise of the nation. Though a republican, the Wilson administration called upon him to prepare the national draft law, and awarded him a distinguished service medal for his fine work on the staff of the judge advocate general. He has the full confidence of the president, and according to those who know him best, is most reluctant to remain in the public service. Acceptance of the Tokyo post represents considerable personal sacrifice which he has made in order to serve the nation and the president.

It is the same in a larger sense with General Wood. His acceptance of the Philippine post can be made only at a sacrifice of other ambitions and hopes, for unless there is some settled policy that will permit him full scope to display and exercise his administrative and other high qualifications, he might as well be sent as minister to Dahomey.

Dr. Jacob Gould Schurman complements the other two. A great educator and a remarkably able man, he comes to China, not as a new theorist on political currents in this part of the world, but as one who has helped to set them in motion, one, who as president of the first Philippine commission, largely contributed towards creating problems that have now to be solved. He also served the nation as minister to Greece and Montenegro and has that experience in diplomatic and other problems that qualify him for the post at Peking. As president of Cornell University he has come in contact with many young Chinese now holding responsible positions under the republic. A friend of China, he is also, like all true and impartial Americans, a friend of Japan. He has spoken in high terms of Japan and shed light on her problems, and at the same time has not hesitated to express his views on the present state of affairs in China. He is a wise choice, the complement of the triangle, the assurance to Americans in all parts of the Far East, that the American legation will not become allied with any Chinese political party, that American policy as embraced within the "open door" doctrine, will serve as his guide. The friend of China, of Japan, Dr. Schurman's end of the triangle, will be as difficult as that of Col. Warren, and his efforts should be concentrated along lines that will tend to terminate the tension between these two neighbors through some sane and acceptable program.

Neither Wood in Manila, Warren in Tokio, or Schurman in Peking, can succeed, unless Americans in these three countries come together in some understanding to back them up

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Crooked Advertising Practices

THE American commercial attaché at Peking has submitted a report to the department of commerce on the irregularities surrounding the expenditure of the advertising appropriation of American manufacturers by their representatives in China.

Our knowledge of this document comes from the *Detroit News* (May 29) which says:—

"SHARP BUT CROOKED."

> "Charges of advertising irregularities in the Far East, made by the American commercial attaché at Peking, are of sufficient importance to command the attention of every American manufacturer exporting to the Orient.
>
> "In a general way the attaché indicates that 'American manufacturers and exporters in China, in making allowances to their agents for local advertising purposes, are not receiving the consideration which their expenditure should warrant.'
>
> "The trouble begins with the necessity, due to the language barrier and lack of knowledge of Chinese tastes and business methods, of the American concern dealing through agents or representatives. The American manufacturer, the attaché indicates, is not well informed of marketing conditions in China and when he authorizes local advertising on a fifty-fifty basis he is badly dealt with.
>
> "Two chief methods are involved in bleeding the American concern: first, there are outrageous commissions; and second and worse, the agent often procures from the favored advertising medium double rate bills, one of which is sent to the American manufacturer and the other, a smaller one of course, is kept by the local agent.
>
> "In the United States, where advertising is a business and has reached a high plane, this seems strangely incredible. Yet the American official, whose business it is to observe just such things, and can have no other object than the service of his countrymen, insists these things are so, that the agent works always to build up a personal little monopoly, and that his methods include double billing, rebating commissions through a dummy, usually a minor employe, charges for services not rendered and other irregular practices long discarded in respectable business circles.
>
> "The demand for American products is so large in China and the opportunities for extending this business so splendid that the American manufacturer certainly cannot afford to see himself swindled at the outset. No one denies an abyssmal ignorance of Chinese methods and Chinese character, and doubtless every land has its unscrupulous citizens. But if American opportunity is to bear full fruit in the Orient it is highly important that the barrier of misunderstanding be removed, and removed as speedily as possible."

We might supplement the above with some of our own experiences, but are firmly convinced that it would have little or no effect on the manufacturer or modify by one iota his advertising policy.

The Pacific Conference

The Road to Good Understanding

UNDER the above title, THE FAR EASTERN REVIEW issued a call for a Pacific conference in March last. We sensed then that the end of the road had been reached, and asked President Harding, "which way do we turn"? "Peace in the Pacific will never stand the strain of another attempt to convert an international conference into a court for the trial of Japan. She has a case, one that must be heard. Let us be fair to China and just to Japan. Let us get together and permit the cases of these two countries to go before the world. Then and only then, will we be able to see behind the screen of secret and confidential propaganda and the arguments of selfish and special interests, and behold the road that must be followed in the future."

President Harding has answered by calling upon the powers to participate in such a conference.

Through the American chargé d'affaires in Tokyo, the Japanese government was informally asked whether it would be agreeable to them to receive an invitation to participate in such a conference to be held in Washington with a view to discussing the limitation of armaments. It was suggested at the same time that the question of the limitation of armaments being related to the Pacific and Far Eastern problems, it would be appropriate that the proposed conference should also embrace a discussion by the interested powers of all Far Eastern questions and that China be invited to participate.

On July 10th an informal proposition of the above tenor was also made to the four powers heretofore known as the principal allied and associated powers in which President Harding suggested that in connection with the limitation of armaments the powers especially interested in the Pacific and Far Eastern problems should undertake the consideration of all matters bearing upon their solution with a view to reaching a common understanding with respect to principles and policies in the Far East. China was also invited to take part in the discussion relating to Far Eastern problems.

The Japanese government replied on July 13th and declared its intention gladly to accept such an invitation. As for the discussion of Pacific and Far Eastern problems, the Japanese government, considering it more expedient, for the purpose of facilitating the attainment of the object of the conference, that the character and scope of these problems should first be defined before expressing its views in this respect, and requested the government of the United States to inform them of the views on that phase of the matter.

After a frank exchange of views the following communication of the American government was conveyed to the Japanese government on July 3rd:--

"The government of the United States deeply appreciates the readiness of the imperial Japanese government to accept the invitation to attend the conference on the limitation of armaments.

"The secretary of state of the United States, in the course of informal conversations with his excellency, the imperial Japanese ambassador at Washington, has expressed the hope that the imperial government would not press its enquiry as to the nature and scope of the Pacific and Far Eastern problems to be discussed at the proposed conference in view of the fact that it is desirable that the full acceptance of the invitation of the American government leave this matter open for adjustment in the precise agenda to be arrived at later.

"The secretary of state is willing to proceed with exchanges of opinion regarding the agenda prior to the meeting of the conference. He considers it inadvisable, however, at the present moment to hamper the program and in particular to delay the arrangements for the conference pending an agreement regarding this matter."

Accordingly, the Japanese government, sent the following reply to the American government on July 26th, expressing their intention to participate in the proposed international conference, and stating at the same time their views in regard to the nature and scope of the problems to be discussed:—

"The Japanese government have taken note of the contents of the American memorandum of July 23rd, received through the American chargé d'affaires, in reply to the Japanese memorandum of July 13th on the subject of a conference on the limitation of armaments to be held at Washington.

"It has been brought to the knowledge of the Japanese government that the government of the United States is willing to proceed with exchanges of opinion regarding the agenda prior to the meeting of the conference and that it considers it advisable to adjust in that agenda the nature and scope of the Pacific and Far Eastern questions to be discussed at the proposed conference. The Japanese government, on that understanding, are happy to be able to inform the American government that it is their intention gladly to accept an invitation for a conference which shall embrace the discussion of the Pacific and Far Eastern questions.

"The Japanese government have been made aware through the communications and the published statement of the American government and the conversations between the secretary of state and Baron Shidehara that the proposition of the American government to discuss the Pacific and Far Eastern problems is based on the close bearing they have on the question of the limitation of armaments which is the original and principal aim of the conference and that, therefore, the main object of discussing these problems is to reach a common understanding in regard to general principles and policies in the Pacific and the Far East. Desiring, as they do, to contribute to the establishment of an enduring peace and to the advancement of human welfare, the Japanese government earnestly hope that the proposed conference may attain the expected results and their ideals may thereby be brought nearer to realization.

"In order to ensure the success of the conference, the Japanese Government deem it advisable that the agenda thereof should be arranged in accordance with the main object of the discussions as above defined, and that introduction therein of problems such as are of sole concern to certain particular powers or such matters that may be regarded as accomplished facts should be scrupulously avoided."

Although we hold to the opinion that a conference between the United States, Great Britain and Japan is the more practical way to arrive at an understanding over the limitation of armaments, yet when it comes to any discussion of Far Eastern problems, China must be given a seat at the table. Pacific problems that affect the peace of the world are largely centered in China and have been permitted to reach an acute stage simply because of the procrastination of these otherwise most practical people in agreeing amongst themselves as to some form of stable government.

Japan's hesitancy in accepting the invitation before she knew what questions would be brought up for discussion was to be expected after her experience in Paris, where the American and Chinese delegations attempted to convert the peace conference into a court for her impeachment. Peace in the Pacific will not stand another such strain.

There are many questions that can come before such a conference, but any understanding arrived at will not be worth the paper it is written upon unless based upon a unified China, with a government which can assume its full share of the responsibilities. As far as China and Japan are concerned there are undoubtedly many minor outstanding questions that serve as irritants, but Japan's position would seem to simmer down to a recognition of her economic and strategical interests in Manchuria and Mongolia Unless the powers and China can supply the necessary guarantees that Japan's interests in these regions will never be placed in jeopardy by invasion from the direction of Urga, it is a foregone conclusion that Japan will insist upon the right to provide her own guarantees. All this, in turn, hinges upon the recognition of the accomplished fact embraced within the extension of the lease to the Liaotung peninsula and the Manchurian treaties of 1915.

Shantung is a minor question. That it has been allowed to overshadow all others is due to the fact that the pressure of public opinion in China will not permit the Peking government to enter into direct negotiations with Japan for its transfer. Japan has stood ready to comply with her pledged word for over a year, but the Chinese, acting under foreign advice, have stubbornly rejected all overtures to discuss the question. They say in effect "you promised to get out, well, keep your promise! We did not sign the Versailles treaty and cannot treat with you on the terms of that treaty." And so the irritating question has dragged along, Japan endeavoring to preserve her "face," with the Chinese as stubbornly determined that she shall lose it. In this position, the invitation of President Harding finds the two nations, wide apart as ever.

The clash of interests that will arise in the conference if the agenda is permitted to include all the questions between China and Japan must centre around Japan's position in Manchuria and the validity of the treaties arising out of the Twenty One Demands. Unless the greatest diplomacy and tact prevails, the conference may break up without accomplishing anything, and defeat its object. If a solution is not arrived at it goes without saying that the situation will tend to grow more and more tense with a sharpening of the issues followed by a renewed burst of war preparations. The Hague conference failed to bring about a common understanding, and materially contributed to precipitate the catastrophe of 1914. The war-makers will swarm around the conference, and make a supreme effort to precipitate a crisis. A determined attempt will be made to turn the conference into another tribunal for the trial of Japan. It will require all the cool courage and judgment of the most experienced diplomats to combat these forces. As we write this, the report comes that the American delegate to the conference will be Elihu Root. He is the one man for the job, the coldest, sanest, and cleverest American diplomat, the best qualified to guide the nation right on such a momentous occasion.

* * *

Denison, Morrison, Ohl

JUST when all the busybodies in the world are greasing the ways erected to launch Japan headlong into a war with the United States, and we are asked to believe that the Japanese look upon Americans with particular aversion and hostility, the Japanese parliament, which rarely votes the public money for ornamental purposes, has approved a bill appropriating a large sum to erect a monument to Henry M. Denison, an American, who for many years prior to his death in 1914, was the legal adviser to the Japanese foreign office.

Denison was the true type of adviser, modest, unassuming, retiring, rarely permitting himself to be thrust into the limelight, but always on hand behind the scenes, when any important move was made. He never attempted to take any credit, but there are those in Japan who do not hesitate to state, that he was largely responsible for that masterly foreign policy that elevated Japan in a decade or so to the front rank of world powers. The refusal of Denison to advertise himself, added to the natural reticence of the Japanese, has made it difficult to appraise the power which he undoubtedly wielded. The Japanese parliament has answered this question for us, and in voting the appropriation for a monument to this American, gives proof once more of its deep gratitude towards those who have stood with them during the critical years when they were emerging from obscurity. There has been no advertising of this appropriation, no attempt to invite the attention of the American people to this simple act of appreciation. It has all been done in the characteristic, quiet, dignified way that distinguishes Japanese methods.

China might well profit by the example of Japan, and indicate her appreciation of the disinterested work that a few foreigners have contributed to the advancement of her cause. There are many names which might be mentioned, but above them all stands that of Dr. George Morrison, the British journalist adviser, who died in harness, and the equally distinguished American journalist, who, as correspondent and then as editor of the *New York Herald*, did more for the cause of China in the United States than all the paid writers who in recent years have invaded the propaganda field. In Josiah Kingsley Ohl, who died last June, China lost one of her great friends one who used his position in American journalism to see that she received a square deal. He made China a front-page subject of American news and induced other prominent American editors and writers to take an interest in her problems. He was the pioneer. China is now deriving the benefit of his work, for if *The New York Herald* had not shown the way when it did, American newspapers would never have taken the interest that they now display in China.

A memorial to Morrison, and another to Ohl somewhere in Peking, would be a very small acknowledgement on the part of China for the great services these two journalists contributed, in their respective countries, to the cause of China. It is almost hopeless at this time to expect the Chinese government to actively interest itself in such a matter, but there are certainly enough public-spirited Chinese student's bodies, journalist associations, etc., that might start a movement for the collection of a fund for the above purpose. THE FAR EASTERN REVIEW will head such a list with a suitable contribution.

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A Son of Mars

MR. Thomas F. Millard is on the war-path, living up to his reputation and getting back with a vengeance at the British who he holds responsible for his departure from China after his failure to direct the German march on Paris from his headquarters on Kiangse Road in the autumn of 1914. Wonderful campaign that! Millard simply closed his eyes and dreamed that he was the Napoleon of modern strategy, the Julius Snoozer of tactical movements, and the way he moved those little German armies here and there over the fields of Flanders, and announced his intimacy with von Moltke, von Falkenheim, and other German military celebrities, who had imparted to him in confidence what they would do to France and England when the day arrived, made the "contemptibles" feel mighty small in the presence of such brilliant generalship.

At the Peace conference, Mr. Millard went to sleep once more, and dreamed that Asia was divided into three great spheres dominated by Great Britain, France and Japan. He dreamed that he read the text of the treaty under which these powers had secretly agreed to freeze out the United States, and when he awoke, imparted this information to the world in a long dispatch to the American press. He wasn't going to let Great Britain put over any such frame-up on America and China. Not he.

He is now in London, and has had another dream. This time he sees war, close at hand, another frame-up on the part of Great Britain to make the United States and Japan fight. And again, he burns up the cables to tell President Harding all about it.

He declares excitedly that:

"The Far East situation is more ominous than I have ever known it to be. I regard war with Japan almost certain and rapidly nearing. A renewal of the old Anglo-Japanese Alliance will surely be directed against America. I am convinced the British government's policy in China is opposed to American policy and secretly works against our interests out there. My opinion is that Great Britain is purposely framing up a war between Japan and the United States."

Somehow or other this sounds strangely like other warnings that come from men, who, like Mr. Millard, pose as advisers of sorts to the Chinese government. Mr. Lennox Simpson had us all scared to death not long ago about the inevitabililty of a war between Japan and America. This gentleman is also an adviser to the Chinese government. His companion, Dr. C. H. Wang, however, told the American people not to fear as China would certainly come to their aid. Funny how they all insist that America and Japan must fight, that war is inevitable, or, as one of the leading Chinese lecturers in the United States, put it: "the United States *must* fight Japan. Your honor is at stake; you have gone too far to back out. If for no other reason, you must fight to protect your trade," and, trembling with excitement, he concluded, "*America must fight Japan*"!! This gentleman, strange to say, is also on the Chinese government pay-roll.

Some Americans express disapproval of the policy of THE FAR EASTERN REVIEW. We invite their attention to the above facts and add that we do not indulge in pipe dreams. We resent a propaganda, having for its purpose a continued agitation against Japan in the American press, which can only lead to strained relations or worse. American editors, unacquainted with all the ramifications of Far Eastern propaganda, are inclined to take Mr. Millard's activities as a joke, and prefer to believe that "he is talking through his hat." We simply invite their attention to the fact that Mr. Millard has been steadily on the war-job for over a decade. We have Mr. Millard's own testimony before the senate committee of foreign relations (when he declared war openly upon Japan and tried to involve the government by placing the words in the mouth of a high American official to the Paris Peace conference) that his expenses were paid by the Chinese government. When he was recently in China, the Peking papers referred to him as an adviser to the government, so the inference is that he is still on its pay-roll.

American editors may believe that he indulges in pipe dreams. THE FAR EASTERN REVIEW knows that he and his ilk are following a calculated and fixed program.

* * *

Bunk

THE great American concessionaire, Washington D. Vanderlip, is back in the United States after another visit to Lenin for his Russian Development Syndicate, bringing in his pocket nothing less than the title in perpetuity to two important naval bases on the Pacific littoral of Siberia, and a concession covering 10,000,000 acres of spruce timber land which, he asserts, will, if properly worked, reduce the price of news print paper from 50 to 75 per cent.

One of the naval base titles is to is Avatcha Bay, at the southern end of the Kamchatka Peninsula. Russians, declared Mr. Vanderlip, have a saying that he who holds this bay controls the Pacific. Its extraordinary strategic importance, he said, is due to its being only twenty-four hours away from Alaska, back of Japan and two days from it, and impregnable as Gibraltar.

The second naval base, of which he declined to divulge the exact location and which he proposes turning over to the American government, lies near Vladivostok and is important for both coal and oil.

The 10,000,000-acre spruce concession is on the Murmansk coast, and one reason why it will so greatly reduce print paper costs is, he said, that pulp made from it there will provide cargoes for vessels returning to the United States from nearby ports.

The Japanese, Mr. Vanderlip said, are fast engendering opposition in both Russia and China. In Siberia alone 19,000,000 white people are bitter against them because of their aggressive policies, and a trade agreement with the United States would be welcomed and would bring most of the important business of that vast country to the United States.

Mr. Vanderlip is taking no chances this time, and comes prepared for war between Japan and America, with the bait to make the American government rise to his cast and the newspapers look to him as a benefactor.

"Russia and China," said Vanderlip, "have entered into a treaty designed to drive the Japanese from the Asiatic coast. An attempt will be made to force the Japanese out of Shantung as soon as Russia is able to furnish the Chinese with arms. That will be very shortly. Japan then will establish a formal blockade of the Chinese and Siberian coasts and it will be up to the United States to go in and break the blockade. That's how the war is going to start."

Mr. Vanderlip is certainly secretive and it intrigues our curiosity to locate that mysterious second great naval base that lies near Vladivostok, so important for both coal and oil. Funny that the Russians never discovered this great port before now, and went to all the trouble to grab Port Arthur from China and bring about a war with Japan in order to have an ice-free outlet in that direction. Bully good dope is all this that Mr. Vanderlip brings home with him. With the talk of an American naval base near Vladivostok and holding the "key of the Pacific" at Avatcha Bay, the Japanese general staff is probably very much excited. This finds its replica in the yarns circulated in the United States about Japan's seeking a naval base in Mexico. Great bunk!

* * *

100 Per Cent. Profits for Chinese

FREDERIC E. Lee, the United States economic consul at Shanghai, makes some interesting comments regarding the cause of the flow of gold from China to the United States, which began about the first of the present year, reversing the current for the first time in two years. Writing to the department of commerce, Mr. Lee points out that in 1919 China imported gold bars and bullion to the value of $79,295,738 United States currency. Fully as large a quantity was imported in the first seven or eight months of 1920, but at the end of that period the unsettled market conditions in the United States and the rest of the world virtually wiped out China's export trade, and its capacity to absorb the yellow metal ceased. When at the close of the year and in the days preceding the Chinese new year, February 8th, silver exchange dropped to 2 to 1 and below, two dollars Mexican for one dollar gold, the Chinese dealers began to take their 100 per cent. profit on their gold purchases and export began. From the port of Shanghai alone the exports to the United States between December 30, 1920, and February 21, 1921, amounted to approximately $10,000,000 gold.

The principal cause for this export of gold is that it is an exchange transaction in which the Chinese dealers have made large profits. Much of this gold was purchased when $1 Mexican would buy $1.14 gold. A second cause for this export is that with the stoppage of export and the impossibility of consignees accepting imports because of the unsettled conditions, less gold is required by the foreign exchange banks in handling foreign exchange transactions, so the surplus is being sent to points where it is more readily convertible.

* * *

The Japanese Engineer

WE have heard much loose talk about the inferiority of Japanese products, of the flimsy character and lack of efficiency of their machines, in fact, all the usual criticism which befalls the lot of a new nation entering the world's economic field or a new firm who starts in to compete with an old established one. The new-comer always has his faults. There are many explanations to account for the backwardness of the Japanese engineer and his alleged lack of efficiency, but is has remained for R. Torokai, professor of electrical engineering in the Imperial University of Kyoto, to plead the cause of his countrymen in a manner that must be received with sympathy and understanding by engineers of other nations. As an introduction to an article in *The Times* on the development of the Electrical Goods Industry in his country he points out that "Speaking generally, the electrical goods made in Japan do not stand comparison with the products of foreign countries, and the frequent criticism of the crudeness of these and other manufactures of Japan calls for some explanation. As a rule this defect is ascribed to lack of scientific research. Of course it is true that in all branches of science the same progress has not yet been made in Japan as in Europe and America, but personally I do not think that this alone accounts for the inferiority to which I have referred. In my opinion Japan has already made sufficient advance in scientific investigation to meet her industrial needs, and progress in this direction is constant and continuous. There is one factor that must not be overlooked in considering this question, and in approaching it we must ask for the intelligent sympathy of all foreigners.

"Japan is a remote country, situated at a considerable distance from Europe and America. She has been practically isolated for a period of 2,000 years, during which Western nations have exercised but little influence upon her economic development, and consequently the Japanese have developed a civilization peculiarly their own. During this long era of isolation they made noteworthy and valuable progress in moral science and the fine arts, but natural science and its applications were neglected. And it must not be forgotten that until quite recently the pursuit of business, trade and commerce, was despised and regarded with contempt in Japan.

"The result of this eremitical development was that, when Japan about 50 years ago began to enter the comity of nations, she could boast of few of the common products of industry and commerce, except silk fabrics and woven art fabrics. She had practically nothing to contribute to the commerce of the world, because all her products were entirely different from those in demand and common use in other countries. Further, when some 50 years ago Japan decided to take her place in and contribute to the economic life of the world and to devote herself to the study of modern science in all its branches, she had to overcome many difficulties.

"For example, there were the obstacles connected with her language, which has nothing in common with those of Europe. Accordingly, to prepare themselves for scientific studies and research work it is necessary for Japanese students to spend more than five years in learning foreign languages. In the middle schools, as a matter of fact, the majority of the hours are devoted to English lessons, and this must needs be if Japan is to take her place in the comity of nations. Japan wants to be numbered among the great scientific nations of the world, and to this end she is prepared to strain every nerve. To accomplish this she would not hesitate indeed to reform and modernize the language of her ancestors, and the present generation would be willing to spend a considerable proportion of its life in acquiring those foreign tongues which are a necessity in these modern days.

"Again, it must not be forgotten that until about half a century ago there were no Japanese workmen trained in modern industries. All Japan's skilled artisans of to-day have been trained during the last 30 years. This fact must be borne in mind when comparing them with their fellowworkers in Europe and America, who have the benefit of generations of skilled training behind them. An appreciation of this truth would lead to less criticism on the part of foreigners of the inexperience of Japanese workmen. The defects of some Japanese goods are largely due to this lack of experience, not to any set policy of deliberate deceit. For myself, I strongly believe that with her increasing ability to supply articles of the highest quality Japan will be able to make her contribution to the world's industry, and the nations generally will forget the mistakes of the past as they realize the tremendous obstacles which have had to be overcome and the economic youthfulness of Japan."

Reiterating the Hay Doctrine

The Wireless Muddle

THE Harding administration has reiterated unequivocally the doctrine of the "open door" in China. The statement of the position of the government arises out of the protest made by the British, Danish and Japanese governments over the contract with the Federal Wireless Telegraph Company to erect wireless stations in certain parts of China. The history of these contracts was published in the June number of THE FAR EASTERN REVIEW. It appears that the Chinese government through Minister Sze asked Secretary Hughes on June 9, whether he contemplated withdrawing support to the wireless telegraph company, and on July 1, the secretary replied as follows:

> "I have the honor to acknowledge the receipt of your note of June 9, and in reply assure you that it is not the intention of this government to withdraw from the position hitherto taken by it in support of the rights accruing to the Federal Telegraph Company under the contract of January 8th last.
>
> "In its view, the communications which it has received from the other interested governments, in reply to its enquiries as to the reasons for their protests to the Chinese authorities against this contract, tend only to confirm this government in its belief that the adverse claims which have been urged as excluding the Federal Telegraph Company from participating with the Chinese government in establishing wireless communications are founded upon assertions of monopolistic or preferential rights in the field of Chinese governmental enterprise, which cannot be reconciled either with the treaty rights of American citizens in China or with the principle of the open door.
>
> "Your reference to the principle of the open door affords me the opportunity to assure you of this government's continuance in its whole-hearted support of that principle, which it has traditionally regarded as fundamental both to the interests of China itself and to the common interests of all powers in China, and indispensable to the free and peaceful development of their commerce on the Pacific Ocean.
>
> "The government of the United States has never associated itself with any arrangement which sought to establish any special rights or privileges in China which would abridge the rights of the subjects or citizens of other friendly states; and I am happy to assure you that it is the purpose of this government neither to participate nor to acquiesce in any arrangement which might purport to establish in favor of foreign interests any superiority of rights with respect to commercial or economic development in designated regions of the territories of China, or which might seek to create any such monopoly or preference as would exclude other nationals from undertaking any legitimate trade or industry, or from participating with the Chinese government in any category of public enterprise."

The above note must, however, be read in connection with a former warning of Secretary Hughes to the Chinese government that any cancellation of the American wireless contract would be considered by the American government as an unfriendly act. This served notice on China that she must accept responsibility for acts which tend to convert the Far East into an international cockpit.

Nothing could be clearer or more emphatic than the American stand. It is a warning to the other powers and to China herself that an end must come to contracts and concessions which violate the spirit and letter of the "open door" doctrine. The American government was placed in a dilemma through the signature of the wireless agreement which conflicted with previous contracts entered into by the Chinese government (of its own free will) and closed the door to others.

The reiteration of the traditional American policy may mean much or little. There was nothing else for the American government to do but enter its protest against any contracts held by other nationals which in any way operate against equal opportunity for American interests. In view of the fact that the American protest is directed against a combination of three powers, it resolves itself into the reaffirmation of a principle violated, not only by foreign interests, but by the Chinese themselves. There is little danger that any serious consequences will arise over this dispute, but it places on record once more, a fact that China herself will have to take to heart, which is, it is impossible for the United States to maintain a doctrine designed for the protection of China and American trade, when the beneficiary of the doctrine, consents to its vitiation without protest. In other words, it says, in effect, that the American government will henceforth refuse to recognize any contract which may be entered into voluntarily by the Chinese government, which in any way infringes the principle of equal opportunity. The American note is therefore double-edged. It works both ways.

The difficulty with the wireless contract arises however not so much from the opposition of the British, Japanese and Danish interests, but from the difficulty experienced in raising the loan on the strength of the security set aside to guarantee the interest. It is not a question of diplomacy but of finance and credit. We are reliably informed, that notwithstanding the diplomatic support of the state department, the American group declined to finance the undertaking. Here we find a typical example where the consortium is working in complete harmony as an international brake on matters that might easily lead to misunderstandings and charges of bad faith.

As the Japanese group is scrupulously playing the game with the American, British and French, so we have here an instance proving that the American group is also loyal to its partners. The consequence is that the American telegraph company has had to seek a loan outside the American group, and encountered difficulties because of the inadequacy of the security offered. The original agreement between the Chinese government and the American Federal Wireless Telegraph Company obligated the former to contribute one-half of the funds necessary for construction purposes, and the latter were to find the balance. The earnings of the system were to be applied first, to the payment of interest and sinking fund on that part of the capital furnished by the company, and only after this had been provided for could any part of the earnings be applicable to the Chinese half of the obligation. As we understand the circumstances, the bankers requested the contractors to furnish them with some guarantee other than the earnings to secure their share of the loan, and the Chinese agreed to allocate the surplus revenue of the posts and telegraphs for this purpose. It appears, however, that the surplus revenues of the telegraphs are already allocated to the service of previous telegraph and other loans, and the only tangible asset is the revenue from the posts, a rather dubious one.

Under such conditions, the continued support of the state department means nothing further than a reiteration of general American policy. The real stumbling block seems to be financial, with the consortium banks standing firmly together to put an end to international competition calculated to create discord, and the Chinese government unable to furnish suitable guarantees that would permit an independent banker to safely finance the undertaking.

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The End of a Great Work

In response to the appeals on its charity America contributed $7,250,000 for Chinese famine relief, according to a statement made by Mr. Thomas W. Lamont, chairman of the American committee for the China Relief Fund. The cost of collection was little more than three per cent. or within the original estimate. The quick generosity of America, in addition to funds that poured in from other countries, has resulted in the saving of millions of lives. In emphasizing these points Mr. Lamont states:

"1. In the Chinese famine of 1907 America's contribution can be very roughly estimated at not more that $750,000. For the present famine the total American contributions amount to $7,250,000. The total has been made up to $4,542,996 collected by the committee and sent direct to China; $250,000 contributed by the Chinese in America; $1,355,563 sent direct to China through various church agencies: $1,106,000 contributed by the Red Cross. In addition the president of China has reported that contributions in China from the government famine relief bureau, the national relief society, the provincial governments and other charitable organizations, excluding the proceeds realized from the loan secured by surtax on imports, have totaled about $6,000.000.

"2. The total cost of the committee's campaign as of May 31st, 1921, has been less than 4 per cent., and if the gifts reported by the other bodies be included the cost, will only slightly exceed 3 per cent.

"3. Any available funds still on hand and any further contributions will, if a feasible program can be devised, be devoted to the study of methods to prevent future famines. This question the American advisory committee in Peking has for some time been studying.

"4. A copy of this informal report is being forwarded to ex-President Wilson, who last December named the original American committee, and to President Harding, who last March issued a public appeal in behalf of the work."

* * *

Japan Plays the Game

It seems that about once a month some sober-minded leader of public opinion in the United States is called upon to publicly give the lie to the ever recurrent slanders set in circulation about the honesty of the Japanese. At least four times within the past few months, Mr. Thomas Lamont, as chairman of the consortium, has publicly disavowed statements emanating from China about the bad faith of the Japanese bankers. Most of this misunderstanding is traceable to the news items in the Chinese press about the recent activities of Mr. Ono in Peking in renewing the Nishihara loans with some tangible security. These loans have nothing to do with the official Japanese group in the consortium and are not included in the scope of that understanding. Whatever terms may be arrived at by Mr. Ono on behalf of the three semi-official banks who made these loans has nothing whatever to do with the attitude of the Japanese group. The loan for the Kirin-Kwainei Railway and the extension of the line from Chenchiatun to Taonanfu is also outside the scope of the consortium, and Japan is quite at liberty to proceed with negotiations with the Chinese government for the financing of these lines without in any way conflicting with the objects of or the understanding of the consortium. These reports, originating in China, were revived recently when Mr. Frederick W. Stevens, the American group representative, returned to America to enjoy his summer vacation. His arrival was construed in some quarters as meaning the end of the consortium and the ascendency of Japanese interests in China.

At a gathering of Americans and Japanese at the Lawyers' Club in New York given by the Japan Society in honor of the Japanese parliamentary party now visiting America, Mr. Thomas W. Lamont again took advantage of the opportunity to testify to the good faith of the Japanese group. He said:

"To Americans visiting Japan the hospitality of our friends there is so gracious and so generous that it dwarfs our efforts here, rendered somewhat meagre by reason of the rush and whirl in which we live. I must beg our visitors not to believe that our regard for them is as limited as the time that we place at their disposal.

"My own recent visit to Japan was made in the effort for co-operative action for the benefit of China. One result of the organization of the consortium for the assistance of China was the formation of this partnership among the investment interests of America, Japan, England and France, and it is certain that if that partnership is to function it must be based upon complete confidence on all sides. Mischief makers are constantly stating that they have reason to believe the Japanese banking group is not playing fair with us. I have denied, and am glad here to-day to deny again, any such report. The Japanese banking group is playing the game as fairly as the groups of America, Great Britain and France.

"The chairman of the Japanese parliamentary committee has made one very significant statement to us. He has said that as a result of the momentous events of the last few years a change has come in opinion in Japan—a change not less important than that in many other countries of the world. The chairman has said to us, in effect, that the Japanese people are convinced that militarism is no longer to rule the world and that the Japanese people are not to be persuaded to militarism by any group or clique in their country. This is indeed a statement welcome to all lovers of peace in America and throughout the world. Now, the chairman of this distinguished Japanese delegation states that those ancient memories are henceforth to be put into the background and that Japan is to address herself to a triumph of a new order.

"There are to-day between America and Japan questions, some of them of small, some of them of great, importance, but none of them so serious that they cannot be settled if we sit down on both sides of the Pacific in the same spirit and in the determination, first, to know all the facts and to know them without distortion or exaggeration; next, to discuss those facts with tolerance, understanding and sympathy on both sides. If our Japanese friends will join America in such a program, then indeed we may look forward confidently to a continuance of warm friendship between these two great peoples, separated only by the fast narrowing measure of the Pacific Seas, and to maintenance with Japan of a joint determination to maintain the peace of the Far East."

The Lesson of the Tenders

THE opening of the tenders for Chinese railway rolling stock and construction of the Yellow River Bridge which resulted in the awarding of the majority of the contracts to Belgian manufacturers will have a far-reaching effect. The Belgians won out against the competition of the industrial world. They won on their merits and no honest competitor can feel resentful or begrudge the legitimate rewards of self-sacrifice and hard work. Their success, however, must compel a radical readjustment of ideas and an awakening to realities. Especially must it compel serious thought amongst the consortium powers, whose original program contemplated the advancement of railway and industrial loans to China without strings for the supply of materials. These were to be purchased in the open market, that is, by public tender amongst the manufacturers of the consortium nations, Great Britain, France, Belgium, Japan and the United States, with preference to materials manufactured in China. It was a beautiful program, devised by theorists who held firm to the belief that American trade supremacy gained during the war would last for many years, enabling our manufacturers to hold their own in any competition with the broken-down industries of Europe. It was thought, that the European manufacturers would be so busy supplying the needs of Europe for the next ten years, they could not actively compete in foreign fields, and, therefore, there was no necessity for any loan terms that would guarantee to American manufacturers their fair share of the orders for materials. In the March 1920 number of THE FAR EASTERN REVIEW, we entered a protest on behalf of American manufacturers who, we felt certain, could never compete with British, Belgians, French and Japanese as soon as they were prepared to re-enter the foreign field. It will certainly bring little profit to the American manufacturer, or, the manufacturers of the other consortium nations, if they are to provide loans to China, and then enter into cut-throat competition for the orders. American money will never flow into China under provisions which will divert it to Europe for supplies which furnish employment to European labor, while there are millions of men out of employment in the United States or vice-versa.

The idealists of the past administration severely condemned THE FAR EASTERN REVIEW for its outspoken defense of material American interests. Well, nearly two years have passed. The consortium as yet has made no loans to China, but we hazard the prophecy, that whenever such a loan is made for the construction of Chinese railways, the American manufacturer will demand from his government that the contract will contain some provision that will guarantee to them a proportionate share of the orders for materials. Idealism will give way to materialism in business.

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Dangerous Propaganda: Its Aftermath

"It has come to the attention of the bureau of foreign and domestic commerce, that the prospects for the successful sale of American merchandise in China by newly established American exporting firms is not infrequently seriously impaired by the meager knowledge of trade conditions peculiar to the country, and the discountenance of the special requirements of the market on the part of the foreign representatives sent to this field. In this connection it is pointed out that the tendency will appear among Chinese merchants to refuse negotiations with Americans who are not long established firms in China, unless they are convinced of the reliable standing of the new firm and of courteous and thorough treatment given orders placed with it."

This has been culled from *Commerce Reports* because it emphasizes the views expressed in the article "Dangerous Propaganda" printed in the July issue of THE FAR EASTERN REVIEW.

Shipping Cotton Mill Machinery to China

THE heavy shipments of cotton machinery from England to the Orient recently reported in the *Manufacturers Record* are being followed by large shipments from New England to China. The *Boston Transcript* reports the recent shipment of a complete outfit for a 20,000 cotton spindle mill to be built in Shanghai, and the statement of Richard Bogner, traffic manager of the Wah Chang Trading Company, that this is the first of seven mill equipments to be shipped from Boston.

China Trade of New York, a paper founded by Chinese cotton merchants, reports the proposed construction at Canton of a new cotton mill capitalized at $2,000,000, the chief aim of the project being to manufacture goods for Chinese consumption.

The development of the cotton growing and cotton manufacturing industry in the Orient, now proceeding on so large a scale, should be welcomed by all lovers of humanity and civilization.

Some years ago New England was greatly alarmed for fear that the development of the cotton mill industry of the South would destroy its textile interests; while there were supposedly broad-minded business men in the North and West who were decidedly opposed to the industrial development of the South, fearing that the growth of this section would retard the advancement of their sections.

Against such a narrow sectional view for the United States the *Manufacturers Record* has always protested. It insisted that New England should not become alarmed at the rapid development of cotton manufacturing in the South; that there would be room enough in the country for all of the industrial activities which might be created; and that though New England might have to shift its trade perchance to finer goods, or to other lines, the South's development would enrich New England and the whole of the United States.

It believes that world affairs should be looked at from a somewhat similar point of view. If the development of cotton growing and cotton manufacturing in the Orient can add to the prosperity of the people of that part of the world then all lovers of civilization should rejoice in every evidence of progress which would advance the prosperity of China and India and other Oriental countries.

The world is enriched, humanity is advanced, civilization is made safer as employment broadens throughout the world and prosperity increases. That is the basis upon which all the business difficulties of the world should rest, except when it comes to the point of the punishment of criminal nations and criminal individuals who violate all human and Divine laws. They should be justly punished and made to bear the burden of the penalty of their crimes.

* * *

Bully Boy! Belgium

THE only road to success lies through hard work. Little Belgium is once more proving the truth of this fundamental principle. While England and the United States are torn asunder by labor troubles, sunk in the depths of a trade depression with business carried on at a loss and production at a standstill, Belgium looms up larger and larger as an example of industry, thrift and commercial foresight. Belgium's rapid recovery is traceable directly to her recognition that work, industry and manufacture are the true foundations of prosperity, and that the possession of great wealth, unlimited resources and tremendous manufacturing plants, are of little profit to a nation unless the worker is willing to co-operate and supply the energy that will convert these into a real asset.

The story of Belgium's recovery is fully told in a special report to the department of commerce by Commercial Attaché Cross.

"He describes at length, Belgium's foreign investments, amounting to 501,500,000 francs capital. Money this was which went into railway and industrial shares in Argentina, Brazil, Egypt, Canada, Mexico, China, Africa and America. Money invested with such skill that when the withering blast of depreciation hit Belgian currency and sent it tumbling to a quarter of its par value the foreign holdings of thrifty Belgian savers stood up like a rock. These holdings formed a bulwark on which to begin Belgian reconstruction, a bulwark as stanch as if the investments had consisted of reserved gold francs locked safely away in the government vaults.

"In more ways than one these foreign investments gave Belgium something to build upon. Attaché Cross says that 'to every young or undeveloped country of which the rich natural resources were judged capable of ultimately returning the initial investment with a profit Belgian surplus capital has been sent to promote real estate improvements, agricultural operations and building construction, or simply to participate in local enterprise.' And he said:

"'The zeal of Belgian capitalists in opening such fields has its origin in the nation's need for foreign purchasers to sustain its home industries, and foreign trade statistics amply show that, aside from the adjacent countries in Europe, the most active markets for Belgian manufactured products have been those sections in which Belgian financial interests have gained a firm foothold At the same time Belgian financial interests in countries producing raw materials and foodstuffs insure not only a fixed supply for Belgian industry and consumption but also a share in the profits from such purchases.'

"Belgium points the way to procure these outlets, and Attaché Cross transmits a document which the *New York Herald* points out, says to American toilers, savers and bankers, 'Go thou to the ant; consider her ways.'"

Belgium's success in other parts of the world is repeated here in China, where in the tenders for cars and locomotives opened on June 30th, at Peking, Belgian manufacturers underbid and obtained all the orders with the exception of five locomotives which went to the American Locomotive Company. The Societe Belge pour l'Exportation Industrielle, obtained for their principles the order for thirty Prairie type locomotives, and six English type locomotives for the Shanghai-Hangchow-Ningpo Railway, while Messrs. Fearon, Daniel & Company acting for the Cie. Centrale de Construction a Haine-St. Pierre, secured the orders for the 240 steel cars.

Belgians have also submitted the lowest tender for the Yellow River Bridge, or $10,881,297, and received the prize of $80,000 for the second best design, the prize of $25,000 for the third best design going to the French firm of Etablissement Brossard and Mopin, of Tientsin.

* * *

Japan and the Philippines

THE investigation of an American correspondent, Mr. Charles Edward Russell, into Far Eastern affairs, brings into bold relief Japan's real attitude towards the future of the Philippines, and if Mr. Manuel Quezon received the same impressions when he passed through Japan, it should go a long ways towards dispelling a bogey that has been frequently conjured up about Japan rushing into the islands immediately upon the withdrawal of the United States. All of the leading Japanese statesmen interviewed by Mr. Russell disclaim any desire for the islands. The denial may not be conclusive, and strategical conditions might at some future date arise that would compel Japan to adopt other views, but there can be no doubt that they faithfully and impressively reflect the views of the most responsible Japanese element.

Baron Matsui (declared): "If there were nothing else, the Philippines do not lie in the direction of Japan's development. Our experiences in Formosa have proved it. We are not a people for the tropics." Japanese failure in Formasa is, indeed, well known.

The venerable Marquis Okuma recognizes that the islands could be obtained only by force, and says that, with the lesson of imperial Germany in mind, Japan does not care to attempt any such seizure.

Others say that, even if the United States were not to be reckoned with, Japan could master the Philippines only after a long and bitter struggle with an intensely hostile population, and that Japan has no taste for any such struggle.

The most convincing statement is that of Viscount Kaneko, a graduate of Harvard. He reminds Americans that "if Japan wanted the Philippines, she could have had them long ago, cheaply and easily." In 1897, just before the Spanish-American war, Spain, weary of her long struggle with the natives, asked Japan to take them off her hands for $3,000,000. The Japanese government investigated, concluded that the islands were of no use to it, and declined the offer. "They are the same islands today," says Kaneko, "and this is the same Japan."

The evidence seems to grow stronger each day that Japan is under-going a radical change of heart, and even with the spectre of a rapidly increasing population ever before her, she is not so much concerned about immediate outlets as she is in gaining raw materials for her industries and markets for her products. Japan's problem is one of fighting for her existence, and if denied an outlet, she must struggle to obtain economic independence.

* * *

The Yellow River Bridge

A BELGIAN firm will rebuild the Yellow River Bridge, as the result of an award of the special committee of foreign experts called by the Chinese government to examine into the tenders that were formally opened at Peking on June 30th. Belgium again walks away with a great prize in competition with the rest of the industrial world. Twenty-two tenders were submitted—5 Chinese: 4 American: 3 French: 2 British: 2 Japanese: 1 Austrian: 1 Belgian: 1 German: 1 Anglo-American and 1 Franco-American. The contract goes to a combination of Belgian firms in which figure the Société d'Etudes et de Construction, the Société Belge de Chemins de Fer en Chine and the Compagnie Générale de Chemins de Fer et de Tramways en Chine, all having their head offices in Belgium, or a combination of construction companies who have great experience in Chinese engineering work, and know almost to a cent actual cost items and methods of conducting big work. They get the contract for $10,500,000. Aside from the natural patriotic impulse which must have actuated the Belgians to make every sacrifice and effort to hold their prestige in a work which they created, their success (all other things being equal), must be attributed to their familiarity with the ground and ability to meet and overcome obstacles that compels another contractor lacking their experience to make wider allowances for contingencies. On the other hand, the question of exchange gives the Belgians a distinct advantage over other competitors, especially British and Americans. At the present rate of exchange, this advantage over Americans is estimated at about forty per cent., an impossible handicap in such a competition. The same conditions gives the British manufacturer an advantage of at least twenty-five per cent. over the American, a lead that can be pulled down only by a drastic cut in the costs of production, a slash in wages, which the unionized American worker will oppose to the limit.

A novel feature of the bidding was the entrance of two Japanese concerns into the Chinese engineering field, and we find Mr. Sugahara, a civil engineer and contractor of Tokyo, tendering on Project I at a price of $14,972,229 and the East Asia Industrial Company, the strongest Sino-Japanese combination, entering a bid on the same project of $9,736,333, which by comparison with the others indicates close attention to details.

Another feature was the exceedingly low tender of the great British firm of bridge-builders, The Cleveland Bridge and Engineering Company, Limited, whose figure was a little over $5,000,000, or less than one-half the amount of their successful Belgian competitor. In view of the world-wide reputation and recognized ability of this representative British concern, it would seem obvious that they were not fully familiar with conditions.

The main consideration of the experts in determining the award was the design of the structure itself. Something more acceptable than the old screw pile foundation which has failed in practical application in such a shifting river bed as is found in the Hoangho. In awarding the contract, it is said that the committee were unanimous in their decision that none of the forty odd designs submitted filled the requirements and in awarding the prize and contract it was really a question of selecting the least objectionable design. Information from Peking says there is a tendency on the part of the committee to reject all the designs, and devise a new one that meets with their approval and give the contract for its erection to the successful Belgian bidder. The prize of $80,000 for the second-best design was also awarded to a Belgian concern, the Compagnie Générale d'Extrême Orient, while the prize of $25,000 for the third-best design went to the French firm of Brossard & Mopin, of Tientsin. A fourth prize of $15,000 should also have gone to this concern, but under the terms of the competition, no competitor could obtain more than one prize. Americans will be interested in knowing that Messrs. Brossard & Mopin acted for the United States Steel Corporation. The following is the official list of tenderers and prices:—

1.—John R. Freeman, Consulting Engineer, Providence, Rhode Island. (Tender incomplete. Rejected.)

2.—M. Sugahara, Civil Engineer and Contractor (Tokyo).
Projet I $14,972,229.000.

3.—W. Deydier, Ingénieur A & M. á Ire. St Gervais (Seine).
Projet I $8,462,000,00.
Variante $9,250,000,00.

4.—Union d'Entreprises Industrielles Paris (R. Th. Waagner-L. & Y. Biro et Kurez à Vienne).
Projet I $9,331,268.55.

5.—Societa Nazionale Delle Officine di Savigliano (Turin) represented par Compagnie Italienne d'Extrême-Orient (Tientsin). Projet I $8,310,249.31.

6.—M. Sidney Y. Powell, Consulting Engineer, Shanghai.
Projet I $8,709,454.50.
Projet II $9,952,648.00.

7.—Societe d'Etude et de Construction.—Société Belge de Chemins de fer en Chine. Compagnie Générale de Chemins de fer et de Tramways en Chine, Bruxelles.
Projet A $14,902,844.82.
Projet B $10,881,297.10.

8.—The East Asia Co. (Dairen)
Projet I $9,736,333.80.

9.—Cleveland Bridge and Engineering Company, Ltd.
Projet I $5,165,232.79.

10.—William Forbes & Co. for Arthur McMullen Co. and Minneapolis Steel and Machinery Co.
Projet I $12,457,137.11.
Projet IA $13,369,720.00.
Projet IB $12,818,074.55.

11.—Hugo Liu, Peking, for Lehmann & Co. of Dusseldorf.
Projet I $2,601,427.19 for supplying the steel work only.

12.—Etablissement Dayde et Schneider et Cie Paris.
Projet A $10,038,665.18.
Projet B $10,493,644.88.
Projet C $10,690,344.25.
Projet D $11,142,187.62.
Projet E $10,807,182.22.

13.—Yu Foong Industrial Development Co., Ltd. of Peking
Projet A $8,927,083.44.
Variante $8,198,693.44.
Variante $8,691,983.44.
Projet B $10,149,245.99.
Variante $9,230,995.99.
do. $9,742,555.99.
Projet C $10,428,846.64.
Variante $9,413,726.64.
do. $9,962,786.64.
Projet D $8,740,460.00.
Variante $7,579,970.00.
do. $8,336,250.00.

14.—Lam, Glines & Co. Inc., Gen. Contractors (S'hai & N.Y.)
Projet I $9,804,187.20.

15.—Etablissement Brossard and Mopin (Tientsin).
Projet I $10,846,682.60.
Variante $10,344,755.98.
Projet II $10,380,472.57.
Variante. $10,111,102.80.
Projet III $9,700,499.18.
Variante, $9,504,502.31.

16.—Chung Hsi Engineering Office, Shanghai.
Projet I. $23,018,347.93.

17.—Carlowitz & Co., Shanghai. Fried Krupp Aktiengesellschaft-Friederich Hutte of Rhunhausen (Niederrhien) and Grun and Bilfinger of Mannheim.
Projet I $9,481,944.00.
Variante $8,490,914.00.
Projet II $8,053,400.00.
Variante $7,451,180.00.
Projet III $10,786,895.00.
Variante $9,440,525.00.

18 —The Kai Cheng Engineering Co., Peking.
Projet I $14,000,000.00.

19.—Compagnie Generale d'Extreme-Orient à Paris.
Projet A $9,299,184.31.
Projet B $10,490,981.97.

American Engineering Advertising

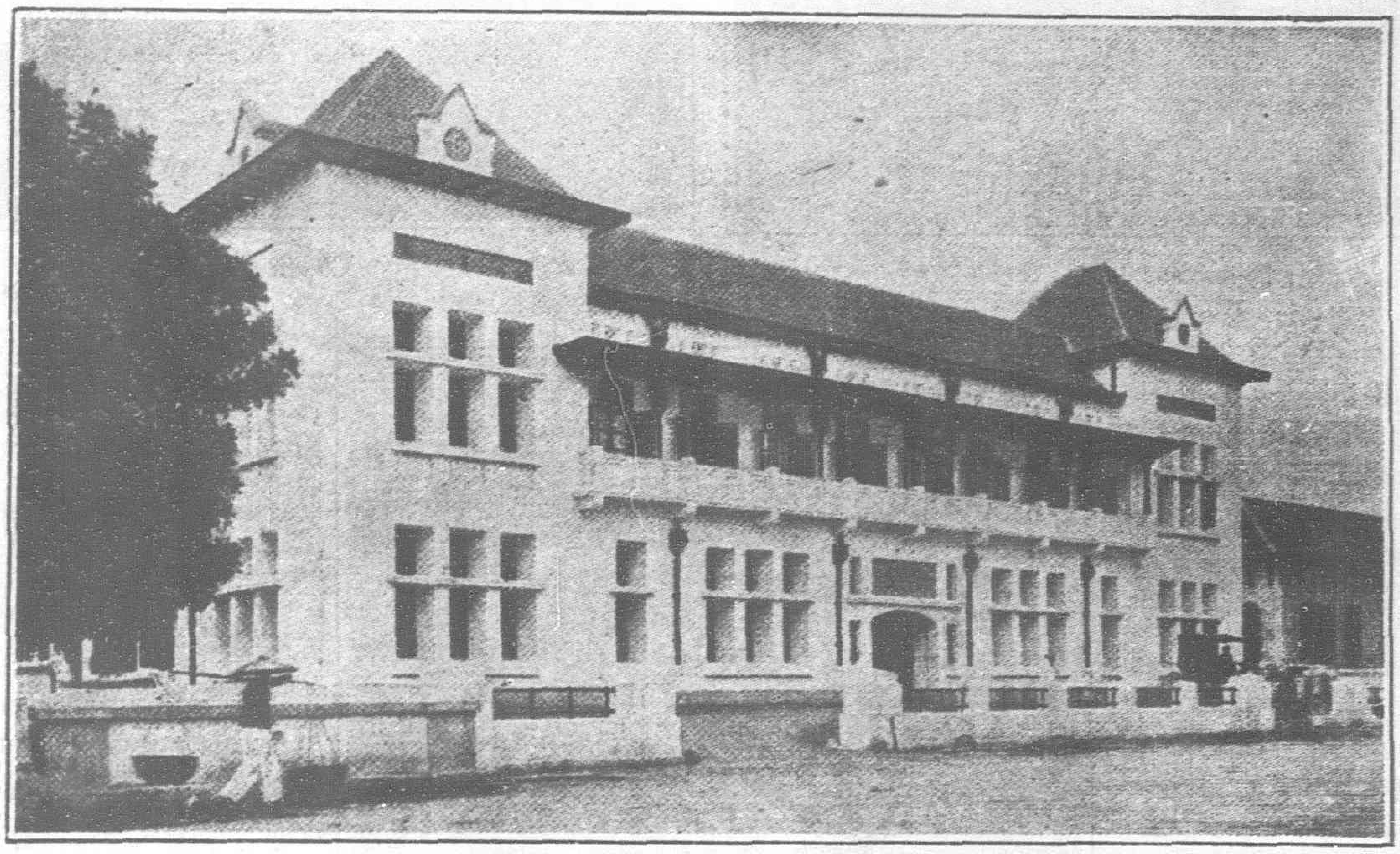
One of the most gratifying results of the post-bellum trade campaign, is the awakening of American engineering manufacturers to the necessity of advertising in foreign technical publications, and engaging experts to supervise their expenditures. In nearly every instance where supervision over their foreign advertising has been entrusted to experts, the returns have been commensurate with the outlay. Too often, however, the manufacturer is guided by the advice of export firms whose choice of mediums is influenced by national, political or sentimental reasons. The report of the American commercial attaché at Peking on crooked advertising practices is a striking illustration of the abuses which arise when expert advice is neglected.

One of the most interesting papers read before the last foreign trade convention was prepared by Mr. A. B. Cole, director of publicity for the Westinghouse Electrical International Corporation, who supports what we have had to say on many occasions. Limitations of space alone prevent us from reproducing this most interesting document in full. He says, amongst other things:

"Many concerns have treated their foreign advertising as a side issue, and carry it as a heavy liability, owing to the lack of proper co-ordinated sales and advertising effort behind a set campaign or advertising program. A certain investment in advertising can be made to produce returns that will parallel, if not exceed, any other investment of equal amount. It can be made to—Add to sales directly add to sales indirectly, create good will for manufacturer and commodity, change living conditions, analyze markets, discover demands for products when none appear to exist, open channels of distribution, and successfully counteract resistances both active and passive."

Industries in the N. E. I.

IN general, Dutch East Indian industry is still in the primary stage of its development. Only a few agricultural industries (cane sugar, rubber, tea, quinine, copra products — concerning which there is considerable data in the archives of the Dutch Government—the oil industry, the tin industry on the Islands of Banka and Billiton and perhaps, also, a few less extensive industries have assumed such proportions as to be of importance to the world household.



Department of Agriculture, Industry and Commerce at Buitenzorg

The disturbance caused by the world war in international business, however, caused the industry of more local significance to gain in importance, and many new industries were established even though at first on a small scale, as a result of this condition.

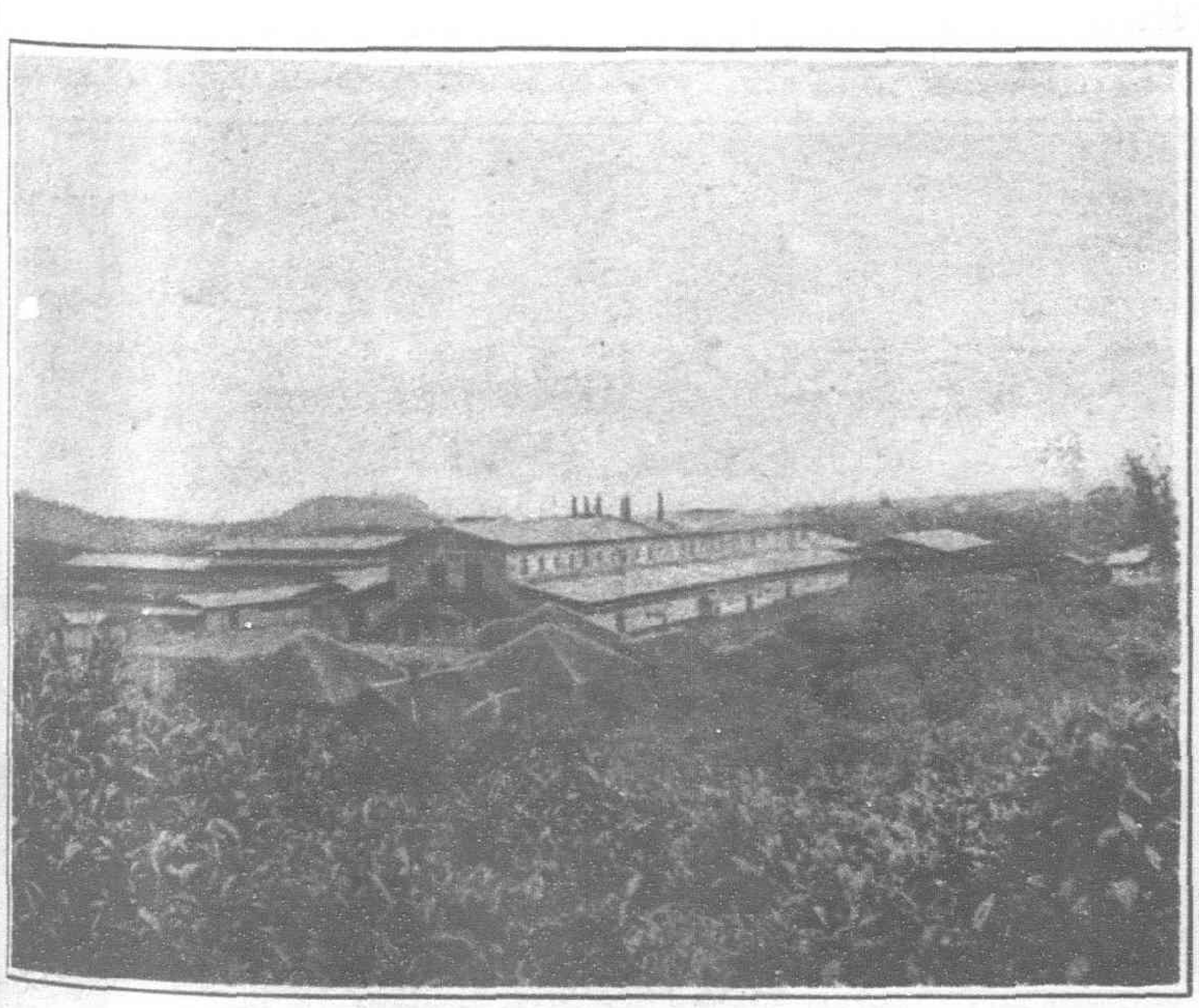
The continually increasing wages in the great industrial countries, in comparison with which wages in Java have become very low, even when the much smaller labor prestation of the Javanese laborer as compared with that of the European or American is taken into consideration, as well as the want of shipping space and the high prices of shipping freights, which have created an effort to have the raw materials produced in the Dutch East-Indies improved and manufactured there, and not in Europe or somewhere else, have considerably improved general conditions for a further development of this industry.

The desirability, also, of assuring to the Dutch East-Indies at least a minimum of economical independence, as demonstrated by the limited international commercial traffic of the last few years, and the necessity of looking about for new means of income for the population of Java, whose rapid increase make it impossible to increase proportionally the chief means of existence, which is agriculture, have again directed the attention of the government as well as of private enterprisers to the industrial development of the Dutch East-Indies.

In order to promote this as much as possible, among other things by close co-operation between the government and private initiative, the commission for the development of industry was created in 1915, which commission consists of high officials, besides men prominent in the financial and industrial field. A delegate member of the commission has charge of the daily course of affairs and keeps in touch with private enterprises.

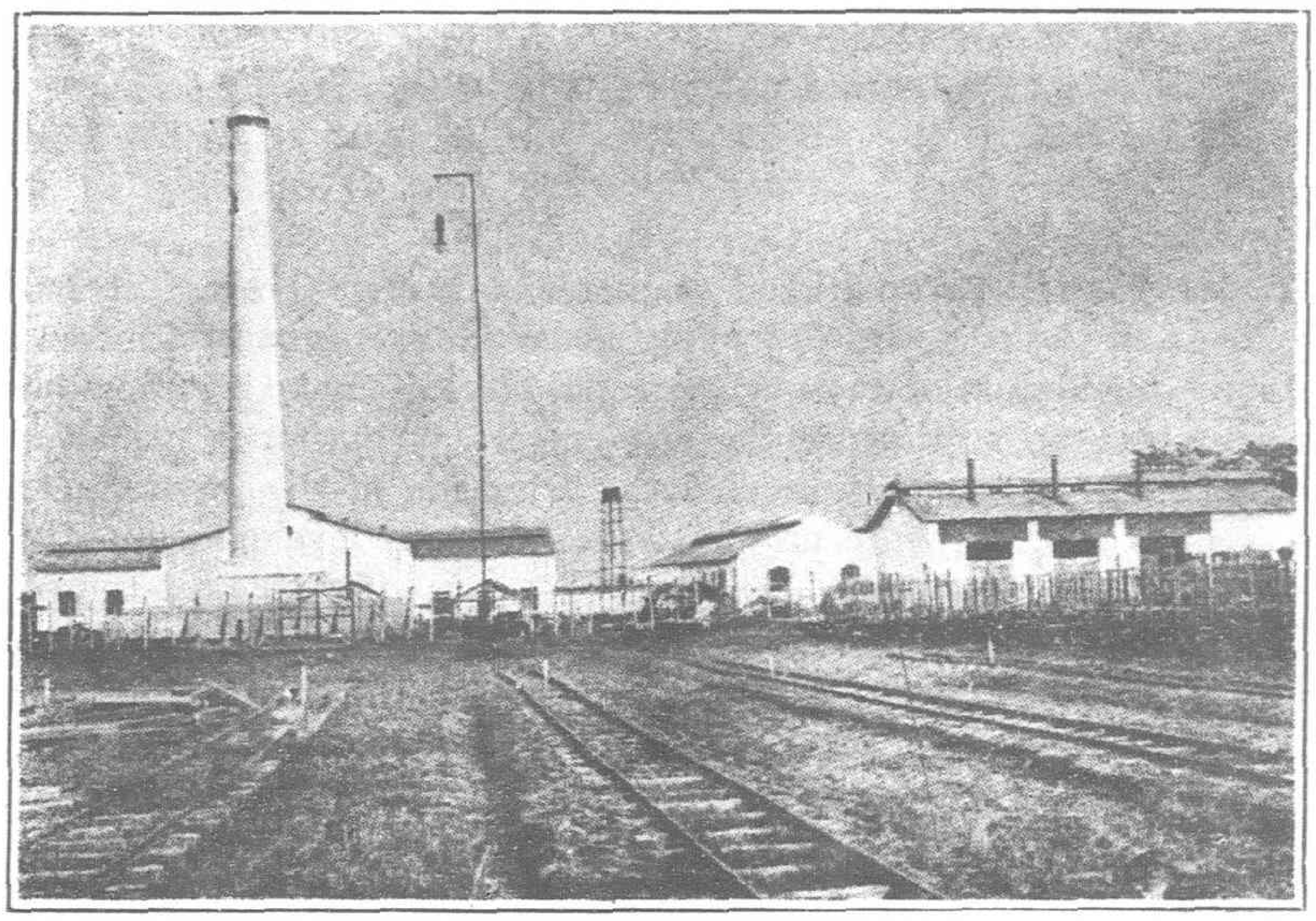
For the promotion of this purpose, also, a separate division of industry was established in 1918, in the department of agriculture, Industry and Commerce, whose task it is to give to private enterprisers as complete information as possible along technical as well as economical lines.

To this division belong various technically trained assistants. It gives, on request, information regarding the source of raw materials, working methods to be pursued, market and labor conditions, etc. It has at its disposal laboratories and workshops, which will soon be considerably increased, where researches are conducted, making it possible for the division to put its advice on an experimental

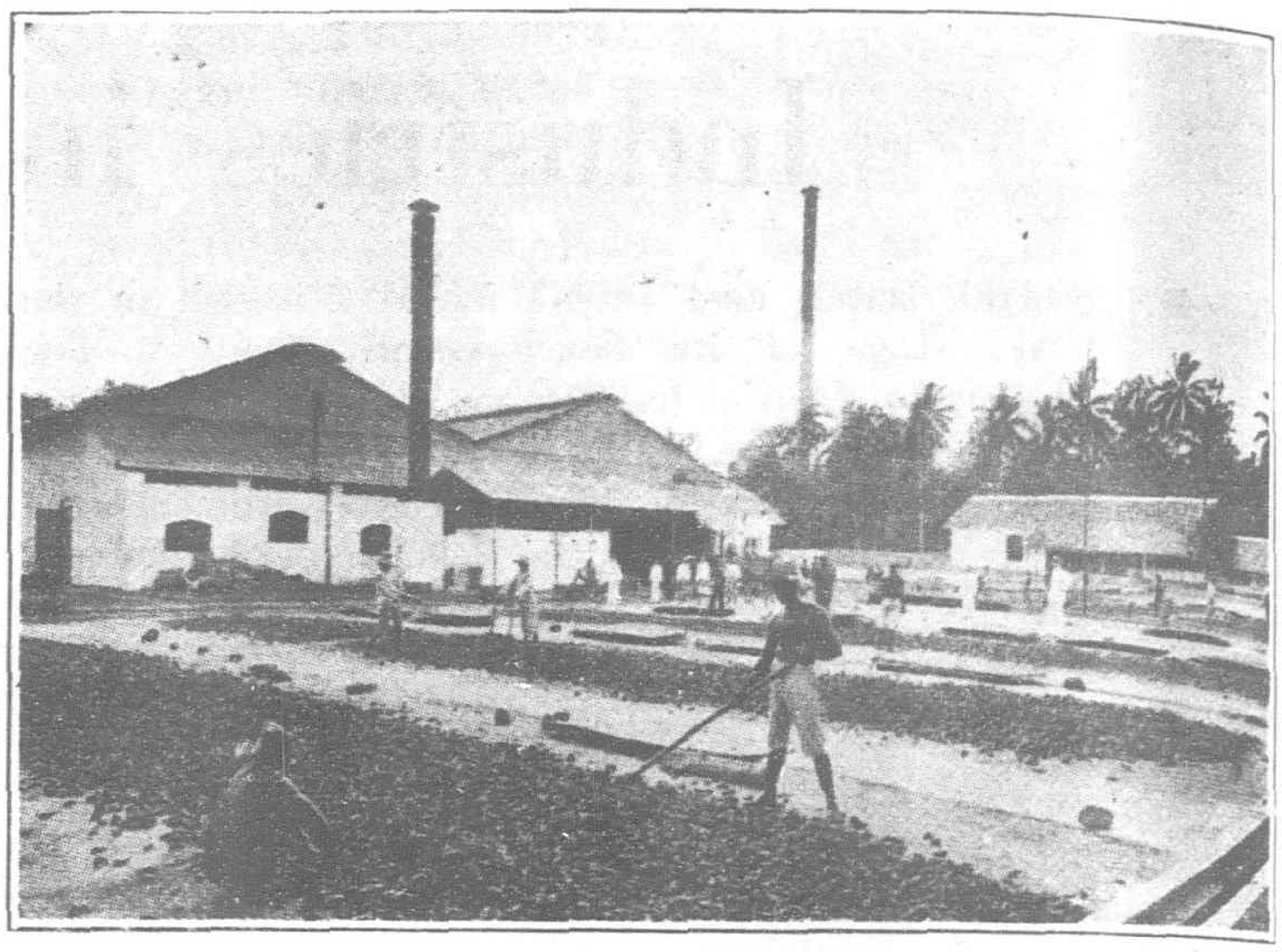


A Tea Factory in Java

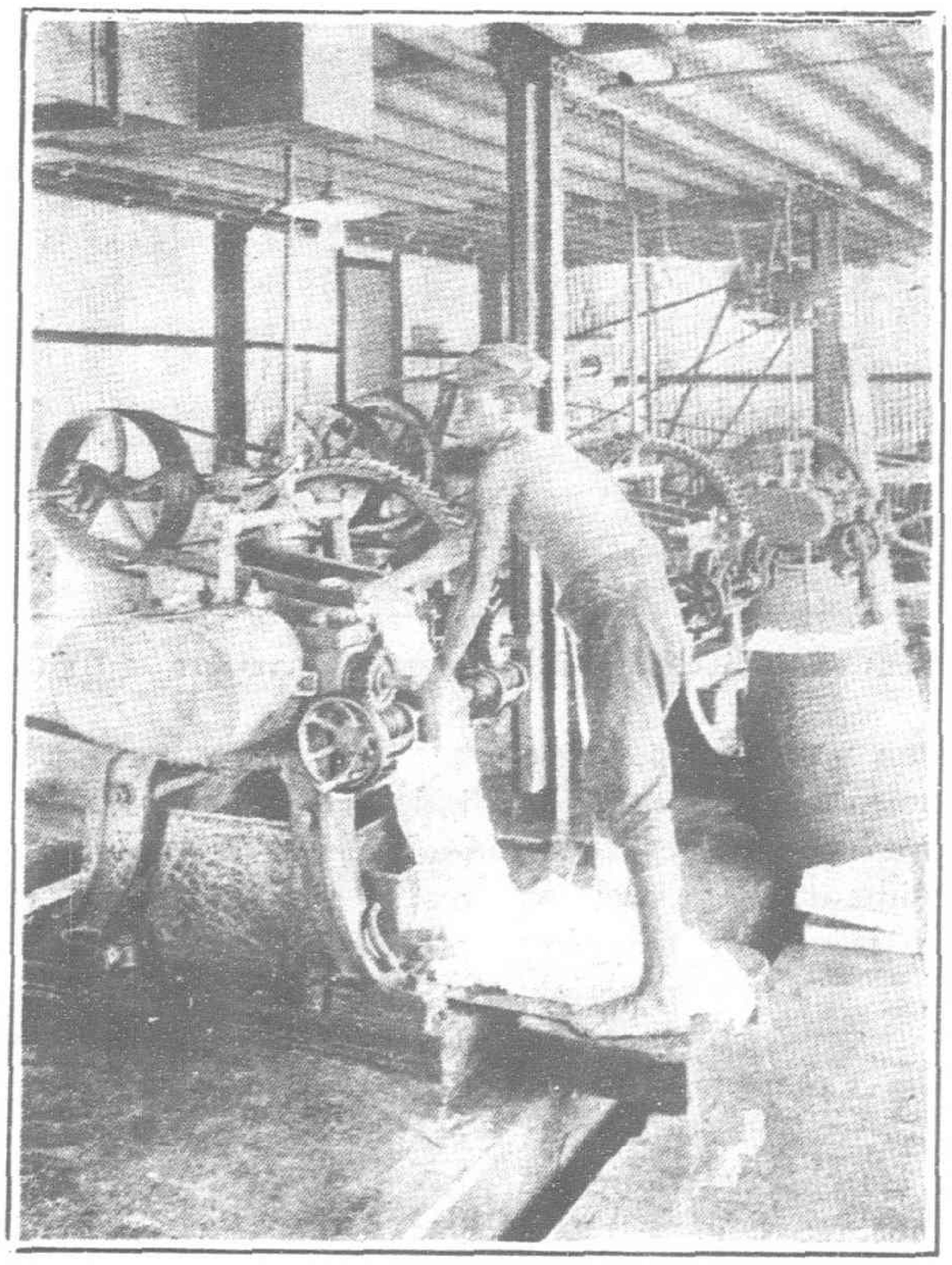
A Candle Factory



Agave Fibre Factory



Copra Drying Central



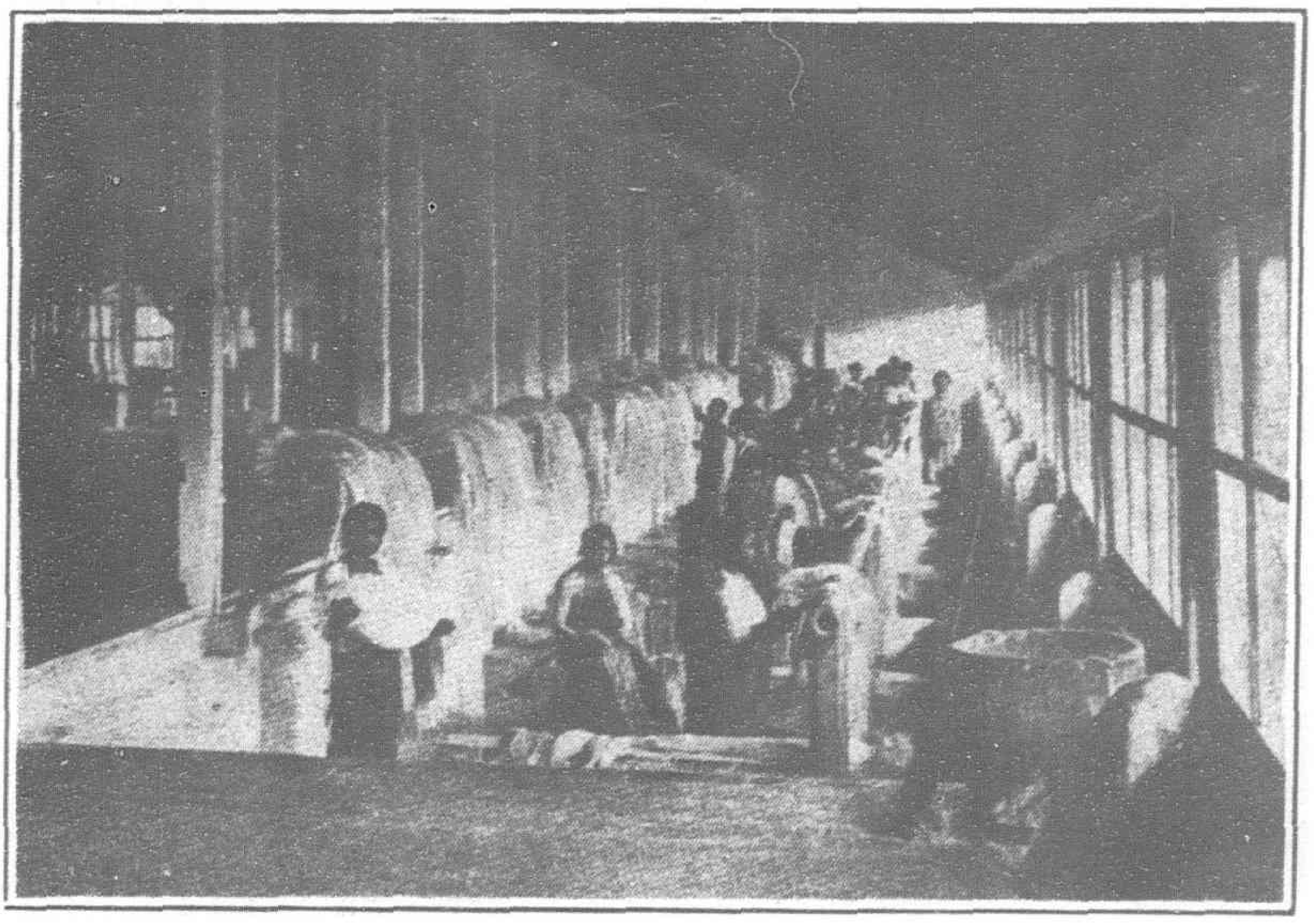
A Rubber Factory

basis and at the same time to take into account the conditions regarding raw materials, temperature, labor, etc., all of which vary in the tropics. An experimental station for the ceramic industry started its operations.

Besides the giving of advice it is the task of the division of industry to take the initiative in introducing new branches of industry, either with or without co-operation from technical officials of other departments. The building of factories for the most important chemical semi-manufactures is now in preparation. Furthermore, the activity of the government extends to the proffering of manufactory premiums and to financial participation in new industrial enterprises, if necessary. From the side of private individuals, interest in the industrializing of the Dutch East-Indies has expressed itself, among other ways, in the founding of the union "The Dutch East Indian Industrial Syndicate," whose purpose it is by general action to look after the interests of the Dutch East Indian industries. The "Dutch East-Indies Annual Fair" association, founded in 1918, also aim to promote Indian industry by the holding of yearly fairs. In May, 1920, the first Dutch East-Indies annual fair will be opened at Bandoeng, in a permanent building especially erected for that purpose.

Besides the factory industry, established on a western basis, the domestic industry of the native population is also a part of the government's care. To raise this industry gradually to the height necessary for a healthy economical development of the colony is the task of the division of industry. The organization of an "outside service" adapted for this work is in preparation.

A few brief facts regarding some special branches of industrymay still be given. All the raw materials necessary for the machine industry must still be imported from foreign countries, since the steel furnace industry in South Sumatra is not yet able to produce, owing to difficulties encountered in its installation. Manufacture is limited to small machines and repairs of



Cleaning Sisal Hemp

Separating Capoc Fibre from the Seeds, Bull and Pil already existing installations. The industry is suffering very much for lack of good, skilled labor. Efforts are being made to provide for this want by establishing industrial schools for natives, but the scope of this instruction, which is still in its first stages, is too slight to show any favorable influence on the industry.

The machine manufacturers in Sourabaya have formed the "Union of Machine Manufacturers in the Dutch East-Indies," by which body efforts are being made to improve the conditions under which the industry is being carried on in the Dutch East-Indies. All machine factories produce also what is known as construction work, such as factory buildings, sheds, iron roofs, etc. Iron foundry is increasing in importance. Shipbuilding in the Dutch East-Indies, so far as iron ships are concerned, is confined to the navy yard at Sourabaya. Here also is felt the importance of skilled work men, especially with regard to the production of water-tight rivet work. The building of wooden ships is suffering from the ever increasing prices of wood.

Great strides have been made during the past few years in the manufacture of edible oils. Together with this has gone the development of oil-refining, to which the great companies have given their special attention. This manufacturing is increasing to such an extent that it is feared the copra production of India will soon prove insufficient. It is expected, however, that native oil-making, by which at present much copra is withheld from the factories, will prove too uneconomical in the long run on account of the very high coconut prices, and a transferance of the coconut produce to the wholesale industry is therefore awaited. However, copra-production must also be increased by the cultivation of coconuts, if the world demand for copra and copra-products is to be satisfied.

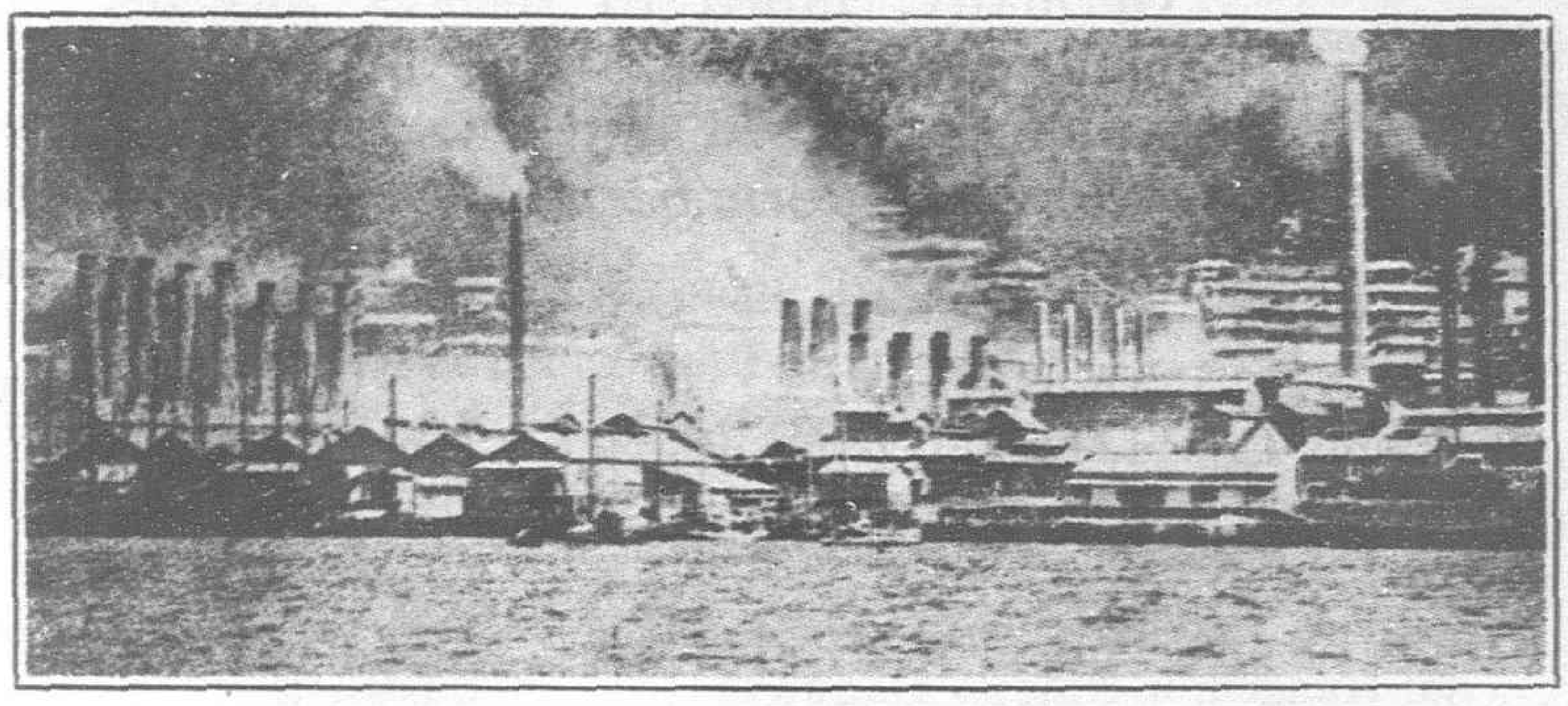
In connection with the manufacturing of edible oils, soap-making is carried on, and already many enterprisers have specialized in this branch, which in the near future will also be run on a more scientific scale. Fire-proof normal-stones and stones of special shape are made in a factory in Rembang. The city of Bandoeng has now its own brick and tile works. The number of these factories, which are under European management, is steadily increasing. Cardboard is made in a factory in Java. There is also a factory where tincans are made, a paint factory, a factory for broom fibre, etc. Spirits and arak are made from the molasses of the sugar factories. At Bandoeng there is a factory for preserved food, which, among others, purveys to the army. In Semarang beer of a good quality is brewed. Tanning-manufacturing is carried on, but will never attain any great development, because superior tanbarks of some difference cannot be obtained. Leather tanning will increase in importance in the future by adapting scientific management. Rope is machine-spun in South Sumatra ; hand-spinning is found in some places in Java. Building materials, such as cement, cement-tiles, mortar, etc., are already made, while factories for artificial marble and pumice cement are being built. Limekilns are increasing in number. A glass factory is being considered.

Sugar factories, tea factories, rice mills, cassava-flour factories, etc., are found in great numbers. Cacoa is manufactured into chocolate in various small factories. The manufacturing of essential oils, alcaloids, etc., is steadily increasing in importance. Cigars and cigarettes are now expertly made in almost all qualities. Mineral water, lemonade and ice factories provide for the need created by the warm climate. A macaroni-factory has been extended. Besides many small fireworks factories there are the pyrotechnical workshops and the Romanit factory.

Among chemical products the chief ones manufactured in the Dutch East-Indies are oxygen, carbonic acid, iodium, sodium bisulphate, sulphur, sulphur carbon, carbide, etc. Opium is manufactured in the government factory at Batavia. The woodwork industry has been enriched by several triplex-chest factories. The number of gas factories is increasing. A real textile industry exists only in the prison at Cheribon. Print shops, book-binderies and factories of office-supplies appear capable of continuous extension. In Bandoeng and in Sourabaya are factories for rubber articles, for which a good future is promised.

Japanese Cement Industry

THE remarkable development of the cement industry in Japan is the subject of an interesting article in a recent number of the *Yakugyo Shuho*, Tokio. It is pointed out that although the manufacture of cement in Japan was commenced in 1880, it was not until 1916 that an export trade was started ; but from that date the productive capacity advanced at a rapid rate, until in 1919 it stood at 6½ million barrels, as against only 1¾ million barrels in 1908. The enervating dullness which sapped the energy of Japanese industry generally on the termination of the war had apparently little effect on the cement industry. This singular immunity from so comprehensive a depression was preserved by the active promotion of the hydro-electric schemes and of general building and engineering works. The prosperity of the industry naturally resulted in the establishment of a number of new concerns. In 1914 the number of cement manufacturing companies was twelve, with a total investment of 32 million yen, but at the end of 1919 the number increased to more than twenty, with a total investment of over 44½ million yen. The frantic establishment of innumerable businesses, always the concomitant of boom, was only to be followed by a closing down of these petty concerns on the first signs of industrial depression. As to the future, the article strikes anything but an optimistic note. The industry at last appears to be suffering from the prevailing depression. The war prosperity was evolved rather out of the stoppage of imports from Europe and America than from any inherent qualities which Japanese cement might have possessed, so that it is not surprising that the export of cement from Japan should decline with the termination of hostilities and the restoration of industrial capabilities in Europe and America. For the present, the export of cement has not suffered to any appreciable extent as compared with 1919, but that Japan will be able to retain the foreign market she had acquired during the war must be regarded as doubtful.



Asano Cement Works at Moji

Road Reparation at Tengyueh

REPORTS the commissioner of customs at Tengyueh that the work of road reparation included the reconstruction of the Siaohoti (小 河 底) bridge that spans a mountain torrent just before its junction with the Tiehshuiho (跌 水 河), or Tengyueh River, at a spot some seven miles distant from Tengyueh. Starting from this point, the whole of the section up to Tengyueh had been dealt with by the end of August. Thereafter various minor repairs were effected in the section between Siaohoti and Chetao (遮 島).

Railway Car and Locomotive Tenders Opened at Peking

The opening of the tenders for the supply of cars and locomotives for Chinese railways, submitted in response to the advertisement of the Chinese Banking Group (who furnished the loan) took place on June 30, at Peking. The tenders were examined by a board of eleven members, five appointed by the Chinese Banking Group and six from the Ministry of Communications. Belgian manufacturers walked away with the most valuable prizes, America came in for five locomotives, while the manufacturers of other nations, Great Britain, France and Germany, failed to receive awards. The Chinese Banking Group behind the Railway Car Loan acting in accordance with the recommendations of the board which examined and awarded the contracts officially announced on July 4th the following information concerning the tenders and the names of those who received them to whom the contracts were awarded:—

ORDERS	SUCCESSFUL BIDDERS	MANUFACTURERS
30 Prairie Type Locomotives for Peking-Hankow Railway	Societe Belge pour l'Exportation Industrielle	Forges Usines et Fonderies de Haine-St-Pierre Ateliers Metallurgiques Tubize Societe Franco-Belge a la Croyere, Belgium
6 English Type Locomotives for Shanghai-Hangchow-Ningpo Railway	Societe Belge pour l'Exportation Industrielle	do.
2 Mikado Type Locomotives for Peking-Suiyuan Railway	Mitsui Bussan Kaisha, Ltd.	American Locomotives Company, U. S. A.
3 Pacific Type Locomotives for Peking-Suiyuan Railway	Mitsui Bussan Kaisha, Ltd.	American Locomotives Company, U. S. A.
100 40-Metric Ton All Steel H. S. Open Wagons for Peking-Suiyuan Railway	Fearon, Daniel & Company	Compagnie Centrale de Construction à Haine-St-Pierre
100 40-Metric Ton All Steel Covered Wagons for Railway T. T. P. R.	Fearon, Daniel & Company	do.
40 40-Metric Ton All Steel Covered Wagons for Shanghai-Hangchow-Ningpo Railway	Fearon, Daniel & Company	do.

I.—Thirty Prairie Type Locomotives for Peking-Hankow Railway

Names of Tenderers.	Names of Manufacturers.	Prices as quoted.
1 Fu-Hsing Trading Co.	Hohenzellern Work for Locos., Germany	G. $50,000
2 Arnhold Bro. & Co., Ltd.	Messrs. Beyer Peacock & Co., Ltd., England	£13,647
3 Andersen, Meyer & Co., Ltd.	Baldwin Loco. Works, U. S. A.	U. S. Gold $52,500
4 Andersen, Meyer & Co., Ltd.	Baldwin Loco. Works, U. S. A.	U. S. Gold $51,000
5 Nicholas Tsu Engineering Works	Messrs. Schneider & Co., France	French Francs 18,962,620
6 Shewan, Tomes & Co.	W. G. Armstrong, England	£18,732 for 30 £19,040 for 15 £19,750 for 5
7 Carlowitz & Co., Tientsin	Henschel and Sohn, Cassel, Germany	G. $49,955
8 Han Yung Co., Shanghai	Humbolt, Cologne and Borsig, Germany	G. $51,900
9 Czecho-slovak Central Economic Commission, Shanghai	German Works' name to be given later	G. $57,000
10 Jardine, Matheson & Co., Ltd.	Lima Loco. Co., U. S. A.	G. $44,700 Total 1,341,000
11 Wah Chang Trading Corp., S'hai	Vulcan Iron Works, U.S.A.	G. $47,600 Total 1,428,000
12 Wah Chang Trading Corporation	Lima Loco. Co., U. S. A.	G. $47,000 Total 1,410.000
13 Charles Ley, Peking	Haine St. Pierre Ateliers Metallurgiques or Societe Franco-Belge	Belg. Francs 464,500
14 Jardine, Matheson & Co., Ltd.	The North British Loco. Co., Ltd., Glasgow	£15,667
15 Jardine, Matheson & Co., Ltd.	Lima Loco. Co., U. S. A.	G. $60,248
16 Norway-China Trading Co.	Linke Hofmann-Works, Breslau, Breslau, Germany	G. $49,215
17 Central Trading Co., Ltd.	The Great Union of German Loco. Works, Germany. "The Specific Name" of the manufacture selected out of this Union for the order to be given in a few days	G. $51,895

Names of Tenderers.	Names of Manufacturers.	Prices as quoted.
18 The Robert Dollar Co., Peking	The Vulcan Iron Works, U. S. A.	G. $50,365
19 Representations Industrielles Belges, Peking	Waiting for Cable advice for Belgium	Belg. Francs 475,800
20 Fearon, Daniel Co., Inc.,Shanghai	Engine Societe Energic Charleroi, Belgium Tender Hame - Saint - Pierre, Belgium	Engine Belgian Francs 409,200 Tender Belg. Francs 56,055
21 Banque Sino-Francaise, Tientsin	Schneider & Co., France	French Francs 18,962,620
22 Representation for British Manufacturers, Ltd.	Forth Banks Loco. Works, England	£13,700
23 Societe Belge pour l'Exportation Industrielle, Peking	Haine St. Pierre Ateliers Metallurgique Societe Franco-Belge, Belgium	Belg. Francs 410,000
24 Societe Belge pour L'exportation Industrielle, Peking	do.	Belg. Francs 452,550
25 The East Asia Industrial Co., Ltd., Tokyo	Kawasaki Dockyard Co., Kei Sha Seizo Kabushiki Kaisha, Japan	Yen 85,000
26 Wah Chang Trading Corporation, Shanghai	Lima Loco. Co., U. S. A.	G. $52,000
27 Mitsui Bussan Kaisha, Ltd., Tientsin	American Loco. Co., U. S. A.	G. $44,200
28 Associated Brass and Copper Manufacturers of Great Britain, Ltd., Shanghai	Vulcan Foundry Co., Ltd., England	£13,075 c.i.f. Liverpool

II.—Tenders for Six English Type Locomotives for Shanghai-Hangchow-Ningpo Railway

Names of Tenderers.	Names of Manufacturers.	Prices as quoted.
1 Fu-Hsing Trading Co.	Hohenzollern Works for Loco., Germany	G. 48,000 each $13,500 spare parts per set $61,500 Local Currency and spare part.
2 Arnhold Bros. & Co., Ltd., Peking	Beyer Peacock & Co., Ltd., England	£17,280 each
3 J. Whittall & Co., Ltd., Peking	North British Loco. Co., Ltd., Glasgow	£13,500 each
4 Carlowitz & Co., Tientsin	Henschel and Sohn, Cassel, Germany	Gold $48,700 each
5 Jardine, Matheson & Co., Ltd., Shanghai	North British Loco. Co., Ltd., Glasgow	£14,133 each
6 Charles Ley, Peking	Forges Usines et Fonderies de Haine St. Pierre 3, Manufacturers given. Belgium	467,000 each. Belgian Francs.
7 l'Exportation Industrielle, Peking	(1) Forges Usines et Fonderies de Haine St. Pierre; (2) Ateliers Metallurgiques a Tubize;(3) Societe Franco-Belge de Materiel de Chenim defer à La Croyeres	412,000 each (duty excluded) Belgian Francs 434,660 (duty and famine surtax included)
8 Norway-China Trading Co.	Linke Hofmann Works	G. $47,530 each $13,260 per set of spare parts
9 Czecho-slovak Central Economic Commission, Shanghai	German Makers, no particular Manufacturer given	G. $56,000 each
10 Representations Industrielle Belges, Peking	Belgian Maker	Belg. Francs 478,100 each
11 Han Yang Company, Shanghai	Humbolt Cologne and Borsig of Berlin, Germany	G. $51,000
12 Representation for British Manufacturers, Peking	R. & W. Hawthorn, Leslie Co., England	£11,000 each £4,500 spare parts
13 Central Trading Co., Peking	The Great Union of German Loco. Works. No name given. Germany	U. S. G. $64,735 each
14 Mitsui Bussan Kaisha Ltd., Tientsin	American Loco. Co., U. S. A.	G. $40,530 each $14,000 spare parts $2,200 per set of trading

III.—Tenders for Two Mikado Type Locomotives for Peking-Suiyuan Railway

Names of Tenderers.	Names of Manufacturers.	Prices as quoted.
1 The East Asia Industrial Co., Ltd.	Kawasaki Dockyard Co., Ltd., Kobe	Yen 100,000
2 Carlowitz & Co., Tientsin	Henschel and Sohn, Germany	Gold $59,225
3 Andersen, Meyer & Co.	Baldwin	Gold $52,500
4 Norway-China Trading Co., Tientsin	Linke Hofmann Works, Breslau, Germany	Gold $56,350
5 Han Yung Co., Shanghai	Humbolt Cologne and Borsig of Berlin	Gold $61,500
6 Fu-Hsing Co., Tientsin	Hohenzollern Works, Germany	Gold $57,000
7 Charles Ley, Peking	Haine - St. - Pierre Ateliers M'clally a Tubize Soc. Franco-Belge, Belgium	Belg. Francs 589,800
8 Czecho-slovakCentral Economic Commission, Shanghai	German Engine Works of best repute	Gold $60,500
9 Jardine, Matheson & Co., Ltd.	Lima Loco. Works	Gold $66,520
10 Hwa Fa Trading Co.	Orenstein and Koppel Berlin	Gold $64,000

Names of Tenderers.	Names of Manufacturers.	Prices as quoted.
11 Societe Belge pour l'Exportation Industrielle	Haine - St. - Pierre Ateliers Metall. at Tubize Soc. Franco-Belge, Belgium	Belg. Francs 548,600
12 Robert Dollar Co.	Vulcan Iron Works or Wilkes-Barre, Pems, U. S. A.	G. $54,550 each
13 Representation of British Mftrs., Ltd.	Forth Banks Loco. Works, Newcastle-upon-Tyne	£17,000 each
14 Central Trading Co., Peking	Great Union of German Loc. Works, Germany	U. S. Gold $60,990
15 Arnhold Brothers & Co., Ltd.	Beyer Peacock & Co., England	£14,904 each
16 Wah Chang Trading Corporation, Shanghai	Lima Loc.	U. S. Gold 68,970 each
17 Wah Chang Trading Corporation	Alternative Mikado by Vulcan Iron Works	U. S. Gold 53,660 each
18 Representation Industrielle Belge	do.	Belg. Francs 603,000
19 Mitsui Bussan Kaisha	American Loc. Works	G. $52,000

IV.—Tenders for Three Pacific Type Locomotives for Peking-Suiyuan Railway

Names of Tenderers.	Names of Manufacturers.	Prices as quoted.
1 Central Trading Co.	Great Union of Engineering Locomotive Works	U. S. Gold $58,636
2 Carlowitz & Co.	Henschel and Sohn, Cassel	Gold $56,400
3 Czecho-slovak Central Economic Commission	German Makers. Name to be given later	G. $65,000
4 Charles Ley	Haine - St. - Pierre Ateliers Metellurgique Societe Franco-Belge	Belg. Francs 584,000
5 Norway-China Trading Co.	Linke - Hofmann Works	G. $53,940
6 Fu Hsing Trading Co.	Hohenzollern Locomotive Works	G. $55,000
7 East Asia Industrial Co.	Kisha Seizo Kabushiki Kaisha, Osaka	Total Yen 282,000 (94,000 each)
8 do.	do	Total Yen 237,000 (79,000 each)
9 Andersen, Meyer & Co.	Baldwin Works	G. $50,900
10 Wah Chang Trading Co.	Lima	G. $60,880
11 do.	Vulcan Iron Works	Gold $52,190
12 Han Yung Co.	Humbolt and Borsig	Gold $58,500
13 Jardine, Matheson & Co., Ltd.	Lima Works	Gold 58,355
14 Representative for British Manufacturers	Hawthorn, Leslie & Co.	£16,500
15 Arnhold Brothers & Co.	Beyer Peacock	£14,310
16 Robert Dollar Co.	Vulcan Iron Works	Gold 53,680,000
17 Societe Belge pour l'Exportation Industrielle	Haine - St. - Pierre Ateliers Metallurgique Soc. Franco-Belge	Belg. Francs 515,000

V.—Tenders for 100 40-Metric Ton All Steel U.S. Open Wagons for Peking-Suiyuan Railway

Names of Tenderers.	Names of Manufacturers	Prices as quoted
1 Yu Foong Industrial Development Co.	Haseluirenfabrik Augsburg Nurnberg	£882 each
2 Shingming Trading Co.	Compagnie Central de Construction at Haine-Saint-Pierre, Belgium	B. F. Frs. 28,905 discounted B. F. 30,443 Francs mounted each
3 Harrisons, King and Irwin	The National Steel Car Corporation	Gold $2,572 each
4 Yangtze Engineering Works	Yangtze Engineering Works	Hankow Tls. 9,200 each
5 Representation Industrielles Belges	Of Belgian manufacture, no makers' name	B. F. 35,600 each
6 Hwa Fa Trading Company	The Dortmond Union and the Orenstein and Koppel A. G. F., Berlin	£88,614 each
7 Arnhold Brothers & Company	Metropolitan Car, Wagon and Finance Co., Belgian Works	B. F. 33,919 each
8 Arnhold Brothers & Company	Lorraine Dietriech, France	F. F. 44,371 each
9 Arnhold Brothers & Company	Metropolitan Car, Wagon and Finance Company Birmingham, England	£12,431 each
10 Reiss & Company	Chickasaw Car Company	Gold $3,132 each
do.	do.	Using Schoen Steel Wheel G. $240, Reduced
11 J. Whittall & Company	National Steel Car Corporation, U. S. A.	Gold $2,550 each
12 Jardine, Matheson & Company	The Metropolitan Carriage, Wagon and Finance Co., Belgian Works	B. F. 36,282 each
13 Jardine, Matheson & Company	Merchants' Despatch Company, N.Y.	Gold $ 3,533 each
14 Robert Dollar Company	American Car and Foundry Company	Gold $3,075 each
15 Fearon, Daniel & Company	Compangne Central de Construction, Haine-Saint-Pierre, Belgium	B. F. 31,325 each

Names of Tenderers.	Names of Manufacturers.	Prices as quoted.
16 Societe Belge Pour l'Exportation Industrielle	Ateliers du Roenix Roenix, Belgium	B. F. 30,530 each B. F. 32,215 each
17 Yu Foong Industrial Development Co.	Union, Dortmond and Orenstien and Koppel, Berlin	£838 each
18 East Asia Industrial Co.	Kawasaki Dockyard Co., Kisha Seizo and Nihon Sharyo Seizo Kaboshiki Kaisha	Y. 6,000
19 General American Car Company	General American Car Company	Gold $3,025 each
20 Fu Chung Corporation	Messrs. Hurst Nelson & Co.	£1,340,000 each
21 Wah Chang Trading Corporation	Magor Car Corporation	Gold $2,891 each
22 Fu-Hsing Trading Co.	I Harkort Duisburg Germany	£ Stel. 625 each
23 Carlowitz & Co.	Firm of Hannoversche, Maschinenbau and Wagon Fabrik, Hannover	7,323 Chinese Dollar each
24 Norway-China Trading Co.	Aktien Gesellschaft fuer Eisen-Industrie en Bruckenbau. Vormals J. C. Harkort Duisburg, Germany	£ Stel. 612 each
25 Charles Ley	Le Ateliers du Roenix, Belgium	B. F. 34,500 each
26 Dowler, Forbes & Co.	Kilbourne and Jacobs Manufacturing Company, Columbus, Ohio, U.S.A.	Gold $3,150 each
27 Andersen, Meyer & Co.	Middletown Car Co., U.S.A.	Gold $289,000 total
28 Representation for British Manufacturers Limited	Cravens Railway Carriage and Wagon Co of Sheffield, England	£10,16,000 each
29 Williams, Forbes & Co.	Pressed Steel Car Company, U. S. A.	Gold $3,095 each
30 Cie - Gen - d' Extreme Orient	do.	Frs. 60,000 each
31 Mitsui Bussan Kaisha	Pennsylvania Car Co.	Gold $2,750
32 do.	American Car and Foundry Co.	Gold $2,826,000
33 Associated Brass and Copper Manufacturers	Birmingham Ry Carriage and Wagon Co.	£1,085
34 Hua Hsing Trading Co.	Midland Car Co. Standard Car and Equipment Co.	Gold $3,605.24
35 do.	do.	Gold $2,995

VI.—Tenders for 100 40-Metric Ton All Steel Covered Wagons for Tientsin-Pukow Railway

Names of Tenderers.	Names of Manufacturers.	Prices as quoted.
1 Harrisons, King and Irwin, Ltd.	The National Steel Car Corporation. Sandberg Works, New Jersey U.S.A. also Hamilton Ontario, Canada	Gold $2,908 each
2 Norsk Chinesisk Handels—A/S Filial, Tientsin	Aktien Gesellschaft fuer Eisen-Industrie en Bruckenbau. Vormals J. C. Harkort Duisburg, Germany	£673 each
3 Arnhold Brothers & Co., Ltd.	The Lorraine Dietrich, Ltd., France	French Frs. 49,559 each
4 Arnhold Brothers & Co., Ltd.	The Metropolitan Car, Wagon and Finance Co., Ltd., Birmingham, England	£1,410 each
5 Arnhold Brothers & Co., Ltd.	The Metropolitan Car, Wagon and Finance Co., Ltd., Belgium	Belgium Frs. 39,108 each
6 Whitall & Co., Ltd.	The National Steel Car Corporation, U.S.A.	G. $2,620 each, C. I. F. Pukow
7 Jardine, Matheson & Co., Ltd.	Metropolitan, Carriage, Wagon and Finance Co., Ltd., Belgian Works	Belgian Frs. 44,415 each, C. I. F. Pukow, including import duty and dues
8 Jardine, Matheson & Co., Ltd.	Merchants' Despatch Co., A Subsidiary of the New York Central Railway Co., New York	Gold $3,842 each, C. I. F. Pukow, including import duty and dues
9 Arnhold Brothers & Co., Ltd.	Lorraine Dietrich, Ltd., France	French Frs. 49,559 each
10 Carlowitz & Co.	Hannoversche Maschinenbau and Wagon Fabrik, Hannover	Chinese Dollars 8,937 each
11 The Robert Dollar Co.	The American Car and Foundry Co., U.S.A.	G. $3,323 each C. I. F. Pukow
12 The Robert Dollar Co.	The American Car and Foundry Co., U.S.A.	G. $3,410 each C. I. F. Hsinho
13 Societe Belge pour l'Exportation Industrielle	Ateliers de Roenix a Roenix, Belgium	Belgian Frs. 34,645 each C. I. F. Pukow, Custom's duty for account of the Tientsin - Pukow Railway
14 Reiss & Company	Chickasaw Car Company	G. $3,259 each G. $3,019 each if steel solid wheel be used.
15 Fu Hsing Trading Co.	T. Harkort Duisburg, Germany	£685 each not including duty or dues in China

Names of Tenderers.	Names of Manufacturers	Prices as quoted
16 Dowler, Forbes & Co. (China) Ltd.	The Kilbourne and Jacobs Manufacturing Co., Columbus, Ohio	G. $3,470 each including duties delivering at wharf special by the Railway later. If no duty G. $250 may be deducted making the price at G. $3,220 each
17 Andersen, Meyer & Co., Ltd.	Middletown Car Co.	G. $3,158 each
18 Leon Hoyaux Representations Industrielles Belges	Belgian Manufacture. Name not stated	Belgian Frs. 40,300 C. I. F. Pukow
19 The Shingming Trading Co., China	Compagnie Central de Construction at Haine-St.-Pierre, Belgium	Belgium Frs. 30,955 each. If frame may be shipped dismounted Belgium Frs. 32,493 each if frames are shipped mounted
20 Associated Brass and Copper Manufactures of Great Britain	Birmingham Railway Carriage and Wagon Co., Ltd. Birmingham, England	£1,160 each C. I. F. Shanghai Hankow and Hsinho
21 Fu Chung Corporation	Hurst Nelson & Co. Motherwell, Scotland	£1,470 each
22 The Yangtsze Engineering Works, Ltd.	The Yangtsze Engineering Works Ltd.	Hankow £9,800 each
23 Charles Ley	Les Ateliers du Roenix, Roenix, Belgium	Belg. Francs 38,150 per piece delivered C. I. F. at Pukow
24 Fearon, Daniel & Co.	Compagnie Central de Constructions Haine-Saint-Pierre, Belgium	Belgium Francs 33,965 C.F.E. duty paid
25 Wah Chang Trading Corporation	Magor Car Corporation, Passaic H. T., U. S. A.	Gold $3,230
26 Shewan, Tomes & Co.	Metropolitan Carriage Wagon and Finance Co., Ltd. at their works at Birmingham or Wednesbury or Manchester, England	£1,383 each for 100 wagons;£1,416 each for 50 wagons; £1,450 each for 25 wagons. Delivered at Pukow
27 Williams Forbes & Co.	Pressed Steel Car Co.	Gold $3,479
28 Mitsui Bussan Kaisha, Ltd.	Pennsylvania Car Co	Gold $2,833
29 Mitsui Bussan Kaisha, Ltd.	American Car and Foundry Co.	Gold $3,313 Gold $3,313
30 Hua Shen Trading Co.	Midland Car Co. or Standard Car and Equipment Co. or Mount Vernon Car Co.	Gold $3,984.76 each
31 Hwa Fa Trading Co.	The Dortmund Union and the Orenstein and Koppel A. G. of Berlin	£1,044/5
32 Yu Foong Industrial Development Company, Ltd.	Machinenfabrik-Augsburg - Nurnburg	£1,044/6
33 Yu Foong Industrial Development Company Ltd.	Union, Dortmund and Orenstein and Koppel, Berlin	

VII.—Tenders for Fourteen 40-Metric Ton All Steel Covered Wagons for Shanghai-Hangchow-Ningpo Railway

Names of Tenderers.	Names of Manufacturers.	Prices as quoted
1 Representation for British Manufactureres	Craven Ry Carriage and Wagon Company Ltd. Sheffield	£1,205 for 40 cars only; if 140 cars price for each cars £1,192
2 Representation Industrielle Belge	Belgian Manufacturers	Belgian Fcs. 40,300
3 Norway China Trading Company Ltd.	Aktien - Gesellschaft Eisen - Industrie and Brucchen ban Duisbury	£673
4 J. Whittall & Co.	The National Steel Car Corporation U. S. A.	G. $2,785
5 Fu-Hsing Trading Co.	T. Harkort. Duisbury, Germany	£685
6 Societe Belge pour l'Exportation Industrielle	Ateliers de Roenix a Rollenix Belgium	Belgian francs 33,645
7 William Forbes & Co.	Pressed Steel Car Co., Pittsburg	Gold $3,745 for 40 Cars; if 140 Cars Gold $3,479
8 Fearon, Daniel & Co.	Haine - St. - Pierre, Belgium	Belgian Francs 33,965
9 Wah Chang Trading Co.	Magor Car Corporation of Hamilton	Gold $3,230
10 Dowler, Forbes & Co.	Kilbourne and Jacobs, U.S.A.	Gold $3,470
11 Robert Dollar	American Car and Foundry, U.S.A.	Gold $3,255
12 Shingming Trading Co.	Haine - St. - Pierre, Belgium	Belgium Francs 30,955 frame dismounted
13 Associated Brass and Copper Manufactures of Great Britain	Birmingham Ry Carriage and Wagon Co., England	£1,160
14 Yangtsze Engineering Works, Hankow	do.	Hankow Taels 9,800
15 Arnhold Bros. & Co.	Metropolitan Car Wagon and Finance Co., Belgium Metropolitan Car Wagon and Finance Co., England	B. F. 39,108 £1,410

Names of Tenderers.	Names of Manufacturers	Prices as quoted
16 Yu Chung Corporation	Hurst Nelson and Co.	£1,470
17 Harrisons, King & Irwin	National and Car Corporation, U.S.A.	G. $3,089
18 General Am. Car Co.	General American Car Co., Chicago, Md., U.S.A.	U.S.G. $3,300 per car if no duty or dues reduced to $3,085
19 Carlowitz & Co., Peking	Hannoversche Maschinenbau waggon Fabrik, Hanover, Germany	Chinese dollar $8,575 per piece provided $ 1=3 mks. $7.80 =£1
20 Andersen, Meyer & Co., Peking	Middletown Co., Penn., U.S.A.	U.S.G. 126,350
21 Shewan, Tomes & Company, Agent of Samuel & Co.	Metropolitan Carriage Wagon and Finance Company England	£1,411 per wagon
22 Charles Ley	Les Ateliers du Roenix, Le Roenix, Belgium	Belgium Francs 38,150
23 Jardine, Matheson & Company Ltd., Shanghai	Metropolitan Carriage Wagon and Finance Co. Ltd. Works, England	£1,510
24 Reiss & Company	Chickesaw Car Co.	U.S. $3,422
25 Jardine, Matheson & Co., Ltd., Shanghai	Metropolitan Finance Carriage, Company Ltd, Belgian Works	Belgian Francs 48,397
26 Jardine, Matheson & Co., Ltd., Shanghai	Merchants Despatch Co.	G. $4,183
27 Mitsui & Co.	Pennsylvania Car Co.	G. $2,833
	American Car and Foundry	G. $3,319
28 Yu Foong Industrial Development Co.	Mashinen fabrik Augsburg Nurnberg.	£971
29 Hua Shen Trading Co.	No makers' name	G. $3,984
30 Hua Sheng Trading Co.	No makers' name	G. $3,386 each

The Tien Pao Coal Colliery

SO little information on Chinese-owned mines is available that when details are obtained they are of particular value. It is not likely that many have heard of the Tien Pao Coal Colliery situated as Hsiang-tan-hsien, Honan. This is a spot about 160 *li* away from Changsha, half a *li* from the Hsiang River and two *li* from the projected Canton-Hankow Railway. To reach it by water 90 *li* must be traversed from Chuchow, 150 *li* from Hsiang-tan city and 240 *li* from Changsha. When discontented soldiery and other pirates are not in evidence, a regular steam launch service plies between Changsha and Hengchow which lands passengers at a place called Chong-shu-ma-tou where an inn of sorts is, the property of the mining administration, is ready to render such hospitality as is possible. In the winter when the depth of the waterways do not permit of steam launch penetration a visitor from Changsha may take the Changsha-Chuchow railway to Chuchow and from this last mentioned place he will be able to reach the colliery by shallow drafted chinese junk in about two days time. All steam launches carry cargo during the spring, summer and autumn: and in the winter the shallow drafted junks each carry about ten tons per trip. The cost of transporting coal from the colliery to these boats is Mex. $0.27 per ton.

The colliery was first registered with the ministry of agriculture in May 1917 by Mr. Li Kuan-li who obtained permission to operate on land covering an area of 342 Chinese acres. Later this gentleman was given permission to extend the colliery's operations over an area of 2264 *mow*, making in all an area of a little more than five square miles.

It is stated that the deposit of coal formed on the banks of the Hsiang-kiang river during the permo-carboniferous period. The presence of carboniferous limestone at the Tien Pao mine is stated to prove this. The basin of coal on which the Tien Pao colliery is situated is 30 Chinese feet thick, running northward 110° E. and inclining at 45°. The length of the basin has been proved to be 9 *li* and its depth as estimated by the natives is 1,500 Chinese feet. With these figures to work on it is estimated that there are about 28,000,000 tons of coal in the deposit.

There are four shafts in all from which coal is hauled to the surface. The first shaft is worked with modern appliances from abroad, while Chinese methods form the means of excavation work in the other shafts. There are eight seams of coal through which the first shaft passes in its depth of 242 feet but only three of these have proved worth operating on. The irregularity in the distribution of coal often causes disappointment, a three-foot seam often dwindling to a one foot thickness which is hardly profitable to work upon. In the second shaft there are three seams two of which have been cut into. Here the seams range from two to three feet in thickness. There is only one seam in the fourth shaft but as yet this has not been touched.

The coal that is mined is bituminous, hard, black, does not stain and is suitable for use in refineries. Its chemical composition is as follows:

> Water 1.4, carbon 72.3, volatile substance 18.5, ash 7.6 and sulphur 1.62.

As regards labor, men who work 8 hours a day can be obtained, with difficulty, at a wage of Mex. $0.30 or Mex. $0.40 per day. These are first class workers but for less efficient workmen the wage paid is Mex. $0.26 per day, and for boys on less strenuous work Mex. $0.20 per day.

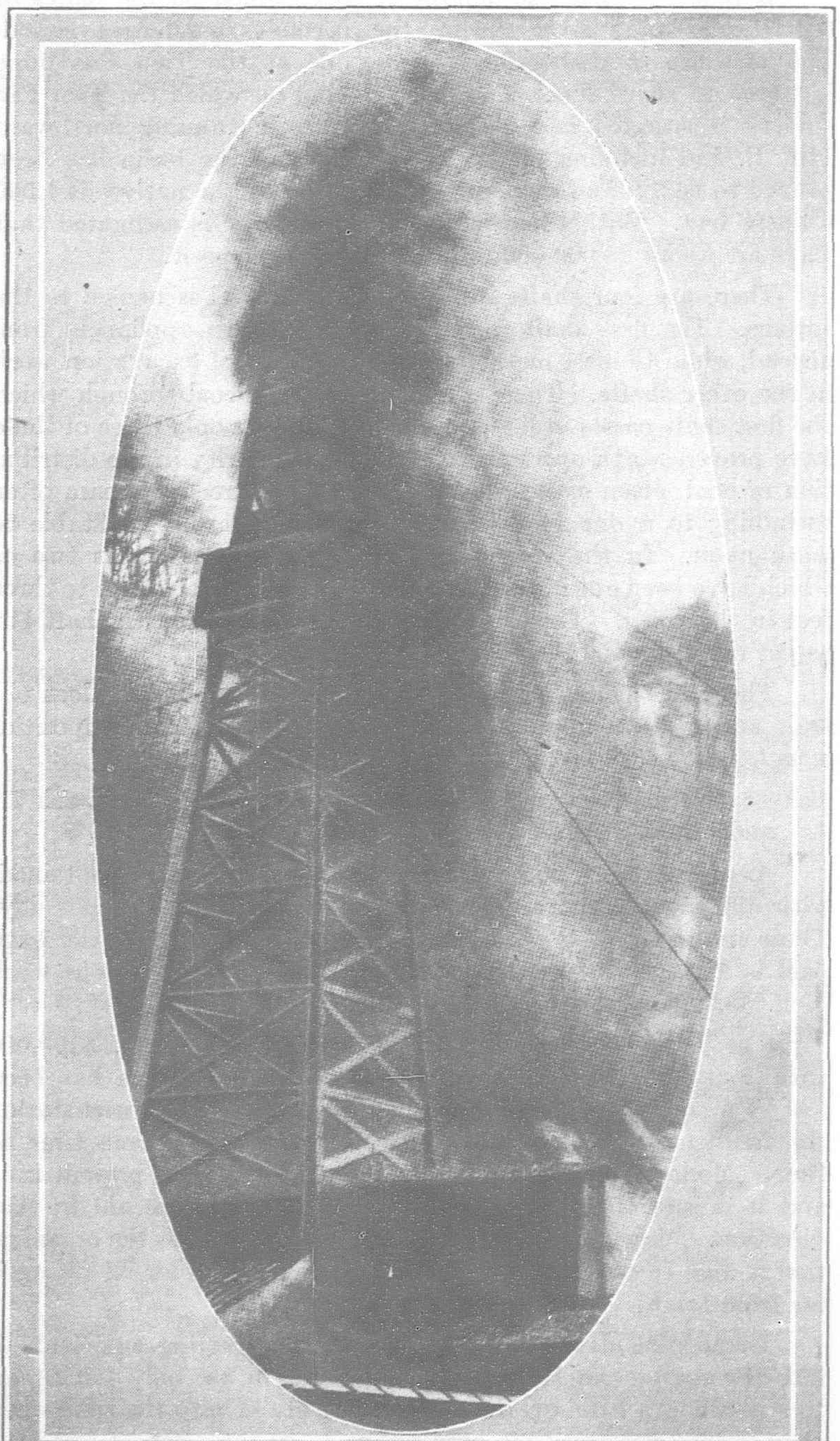
The Tien Pao Coal Colliery is capitalized at Mex. $100,000 with four-fifths of the capital paid up. Much of this has been lost as a consequence of military operations in the district during the frequent civil disruptions that occur in China from time to time. Money is at a low ebb with the concern at the present time and it is said that they do not expect even foreign aid in that direction. Money is also owed on loans so that unless the organization is able to put its financial affairs in proper order its future is far from bright.

Great difficulty is being experienced in getting sufficient air into the shafts, the 12-foot fan at present in use only forcing air to a depth of a little over one hundred feet. Up to the time when they opened the third pit only about 1,700 tons of coal had been brought to the surface from the other shafts. In the third shaft was found a good coal seam but floods and other difficulties prevent a reasonable excavation. Pumps and other modern mining contrivances are badly needed.

From what can be gathered there is a good supply of coal in the vicinity and if the Tien Pao Coal Colliery could be operated on modern Western lines, and under foreign supervision, there does not seem to be any doubt but what reasonable profits could be gained.

OIL IN JAPAN

WRITING on the necessity of establishing a national oil policy, Mr. N. Hasegawa, director of the Tokyo Oil Co., regrets that Japan is apparently without any policy regarding this article of vital importance for national defence. A Naval expenditure of Y.850,000,000 was passed at the last session of the imperial diet for a great expansion to be carried out by 1927. It is to be questioned whether the naval authorities can count upon the sufficient supply of oil to move the fleet newly constructed at so heavy an outlay. The fleet will require 2,000,000 tons of heavy oil a year in time of peace, and 50,000 tons per day and night in time of war. The present annual output of petroleum oil in Japan is 300,000 tons, and the amount of heavy oil produced is only 150,000 tons, which is only enough to meet the naval wartime needs for three days. Even this heavy oil has been used entirely by private manufacturers in the past, compelling the navy to purchase from abroad.



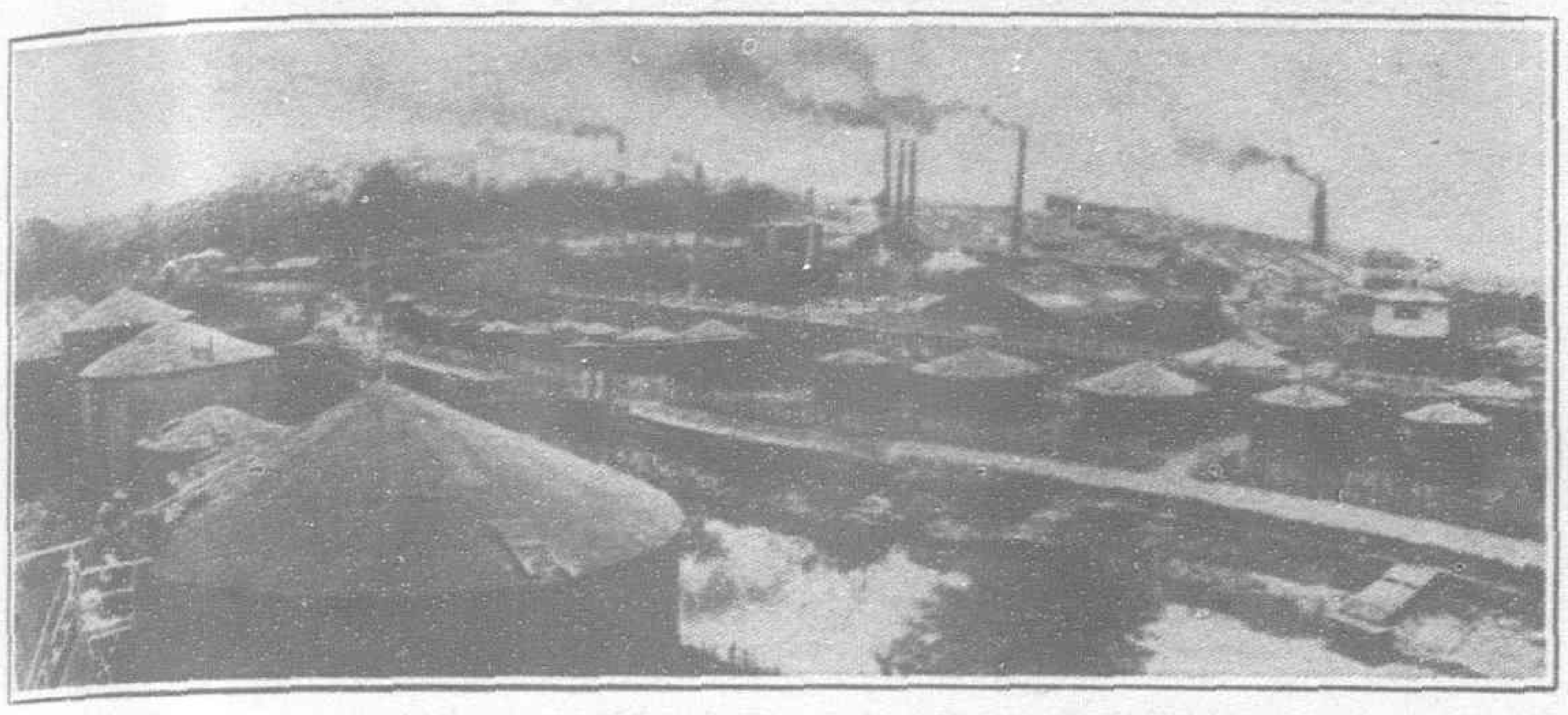
A Big Gusher of the Nippon Oil Company

This will be sufficient to convince one of the urgent necessity of establishing an oil policy. There may be different means of carrying out that policy, but in the writer's opinion, the most important is to develop the oil-fields in our territories, so that we can produce our own supply. The question is then whether Japan possesses so many oil-fields. The oil-fields cover a vast zone from Formosa in the south to Karafuto in the north, of which there are some 1,000 miles of oil-fields in Shidzuoka, Nagano, Niigata, Yamagata, Akita and Aomori prefectures. Hokkaido and Karafuto, which cover an area of 5,000,000,000 *tsubo*. At present the oil mining concessions in Japan extend over an area of 1,250,000,000 *tsubo* of which 10,000,000 *tsubo* form the fields operated producing crude oil to the amount of 300,000 tons a year. In California the yield of oil for 1919 reached 15,000,000 tons, which was obtained from a mining area of 100,000,000 *tsubo* out of total acreage of 3,000,000,000 *tsubo* of oil-fields. These oil-fields are less in acreage by 2,000,000,000 *tsubo* than those in Japan. Still the yield was fifty times as great as that in Japan for the same year. From this, it may be concluded that Japanese oil-fields can be much further developed. Some people argue that the oil contained in Japan is less than that in America. But the writer cannot support the argument. In about 1887 no Americans dreamed of the existing oil in California, and it was only in about 1897 that oil mining there began to develop. In Japan there are now only a few companies engaged in oil mining with a capital of tens of millions of yen.

The oil mining industry was started in Japan after the Meiji Restoration. In about 1877, a certain American geologist announced that Japanese oil-fields were not very important. Later the International Oil Co. prospected for oil at an outlay of Y. 10,000,000, but the attempt was given up, as all the oil-fields in the country were considered shallow. But when the abandoned oil wells in Echigo province were taken over by the Japan Oil Company, oil was struck at the depth of 330 *ken*. Afterwards some of the wells in Kurokawa, Akita prefecture, gave out 10,000 *koku* of oil per day and since then the industry has made rapid strides. Still only a small part of the whole oil property has been touched. How will the question have to be solved ? The writer memorialized the government and the imperial diet on the question during the last session, and it is gratifying to note that the question has now come to be earnestly discussed. The Seiyu party has led other political parties in instituting investigations and is said to have adopted a plan for its satisfactory solution by which it is proposed that the government should draw up estimates for working uncultivated oil-fields in the Japanese territories and submit them to the 44th session of the imperial diet, that the imperial navy to which all business regarding the development of these oil-fields may be left, should entrust private oil manufacturers with the work of prospecting and mining oil, for which it should bear half the necessary expenditure and that the oil concessions producing oil in these fields may be acquired by the government at a suitable price. In this way, the big oil companies so capitalized and equipped as to mine oil on a large scale could sink numerous wells at once. We may also count upon the work of small capitalist, who have hitherto discovered many oil-fields.

One most important thing to do in this connection is to prepare maps which do not at present exist showing lands of the territory stratum in Japan and details concerning this stratum, based on practical survey, so that we can discover the oil-fields according to the distribution shown on the maps. This is too important and difficult to be undertaken by individuals but may be done by the government, which is urged to take it in hand at the earliest possible date.

If the oil question is not solved, the naval expansion will be meaningless. Since the imperial diet approved the naval



Kashiwazaki Refinery of the Nippon Company

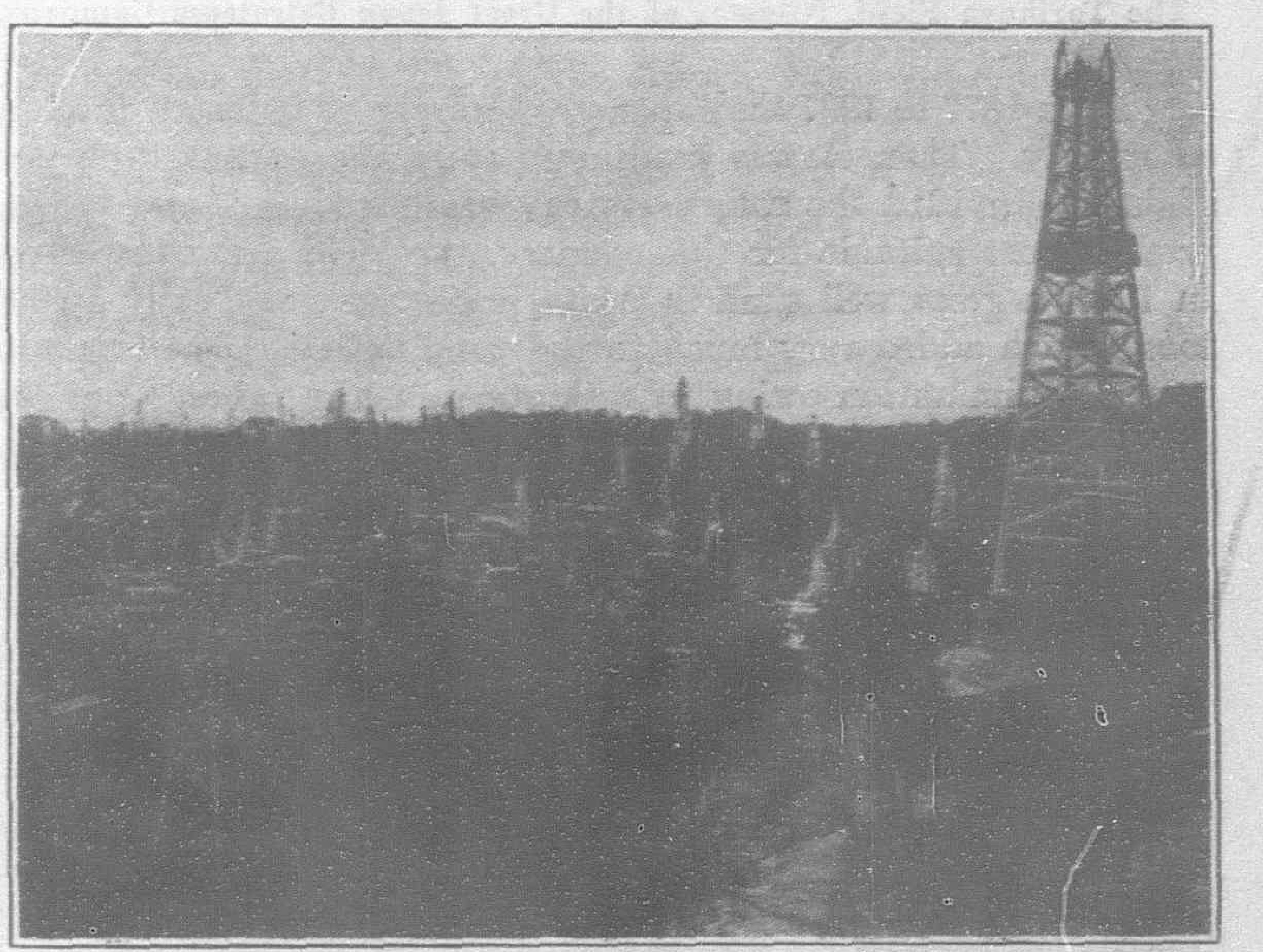
program, it ought to also do something towards the satisfactory solution of the oil question. The world's powers are very enthusiastic over the oil question not only for the sake of their navies, but also for meeting the demand of the age that merchantmen have also to be moved by heavy oil. Besides the uses of kerosene oil are extending in industrial and other lines, and it is absolutely necessary for the development of national strength and for national defence. It is to be most earnestly desired that the government and people should unite in developing the national oil industry.

No investigations have been made public in Japan as yet as to the amount of kerosene oil available in the country. At the end of 1919, there were in Japan 559 kerosene oil concessions granted covering a total area of 72,807,000 *tsubo* of which 225 with a total area of 38,119,000 *tsubo* were being operated and 334 with an area of 34,588,000 *tsubo* were suspended. Besides, there were 1,958 mines with an aggregate area of 1,095,037,000 *tsubo*, being prospected on the same date. Thus, the mines worked, suspended and prospected cover an area of 1,200,000,000 *tsubo*, which is 0.85 per cent. of the total area of Japan. The proportion is greater than the 0.26 per cent. in the United States. The amount of capital invested in the oil industry in Japan is, however, limited and is only Y.60,000,000 as against some Y.10,000,000,000 in the United States. Moreover, only 6 per cent. of the concessions are actually mined, the rest being simply retained by the owners. The yield of kerosene oil in Japan is, therefore, only 0.6 per cent. of the figure in the United States. The following table shows the areas of kerosene oil mines worked and prospected in Japan in July, 1918:—

District	Mines Prospected *Tsubo*	Mines Worked *Tsubo*	Total *Tsubo*	Proportion Per cent.
Niigata ...	457,278,149	48,613,971	505,892,120	44.5
Akita ...	306,937,515	11,168,050	318,105,565	28.0
Hokkaido ...	144,511,693	8,117,777	152,629,470	13.4
Yamagata...	84,501,375	344,844	84,846,319	7.5
Aomori ...	48,650,460	1,035,436	49,685,896	4.4
Nagano ...	13,701,874	653,354	14,355,228	1.3
Shidzuoka...	6,728,307	1,512,760	8,251,067	0.7
Other ...	—	—	2,807,855	0.2
Total	1,062,309,373	71,446,192	1,136,573,520	100.0

Niigata and Akita prefectures produce kerosene oil to the extent of 99.5 per cent. of the national yield. The following table gives the oil-producing districts of Japan together with their output for 1918:—

District	Kerosene oil Quantity *Koku*	Proportion Per cent.	Value Yen	Natural Gas Quantity 1,000 C.F.	Proportion Per cent.	Value Yen
Oshima (Hokkaido)	11	0	151	0	0	0
Ishikari ,,	5,318	0.3	97,642	0	0	0
Kitami ,,	1,447	0.1	19,857	0	0	0
Iburi ,,	796	0.	11,579	0	0	0
Yamagata Prefecture	247	0	1,604	0	0	0
Akita ,,	835,491	39.0	9,876,691	299,060	32.3	115,233
Niigata ,,	1,297,725	60.5	20,381,449	627,227	67.7	1,072,977
Shidzuoka ,,	1,372	0.1	26,050	0	0	0
Nagano ,,	182	0	2,394	0	0	0
Kagoshima ,,	0	0	0	344	0	288
Total ,,	2,142,589	100.0	30,417,097	926,641	100.0	1.438,118
Formosa ,,	8,101	0	146,525	0	0	0
Grand Total	2,150,690	0	30,563,622	0	0	0

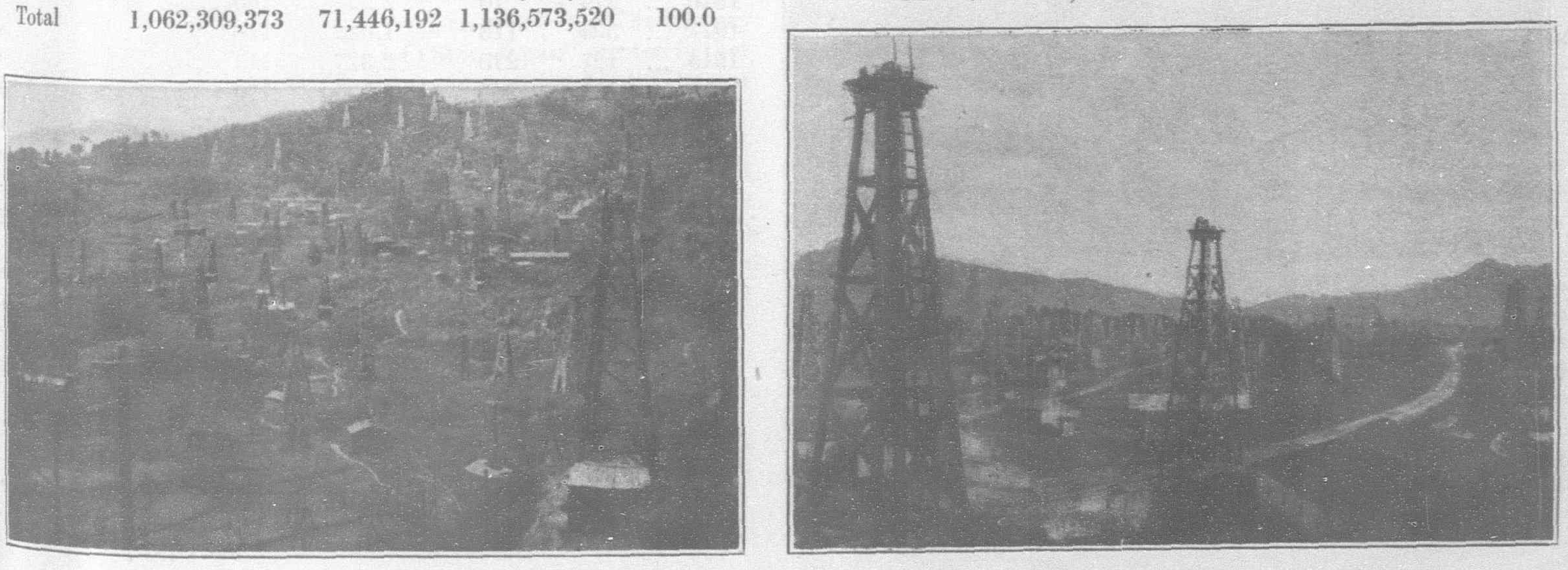


Wells of the Nishigama Oil Field, of the Nippon Oil Co.

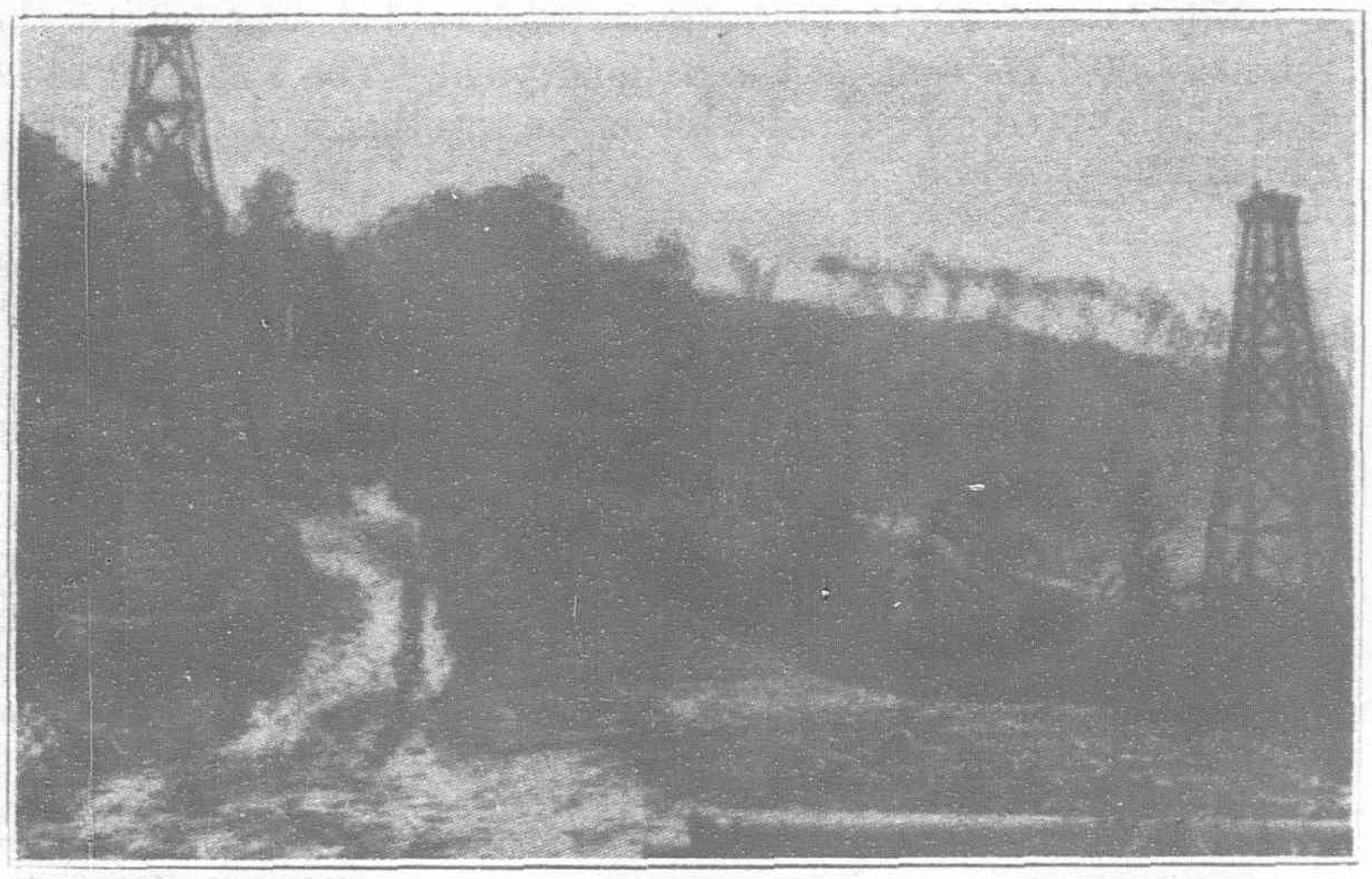
The following table shows the production of kerosene oil since 1877:—

(In thousands of *Koku*)

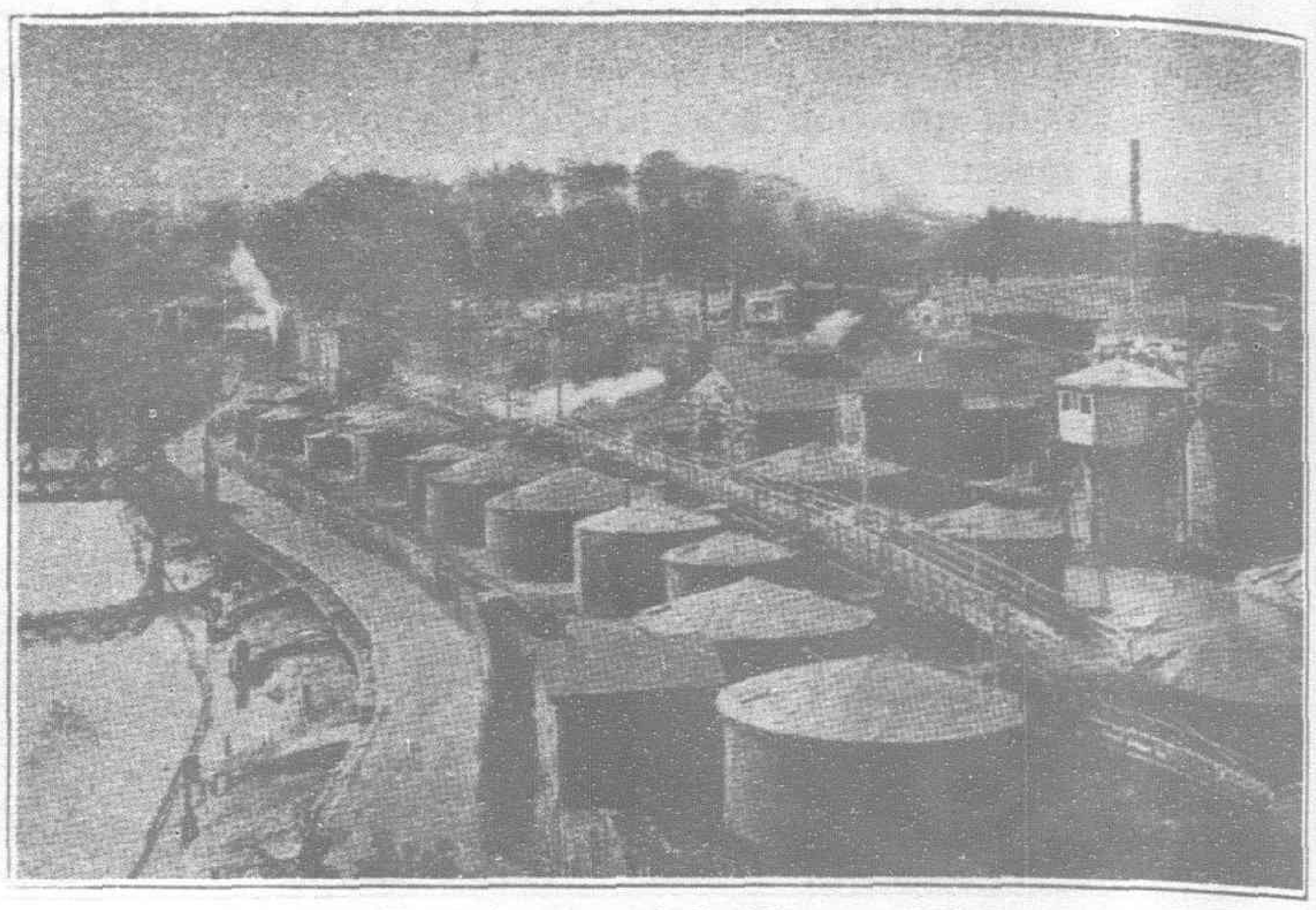
Year	Production	Year	Production
1877 ...	10	1912	1,438
1887 ...	30	1913	1,692
1897 ...	231	1914	2,333
1902 ...	878	1915	2,613
1907 ...	1,514	1916	2,592
1908 ...	1,641	1917	2,509
1909 ...	1,657	1918	2,142
1910 ...	1,608	1919	1,987
1911 ...	1,529		



GENERAL VIEWS OF THE HODEN OIL COMPANY'S WELLS

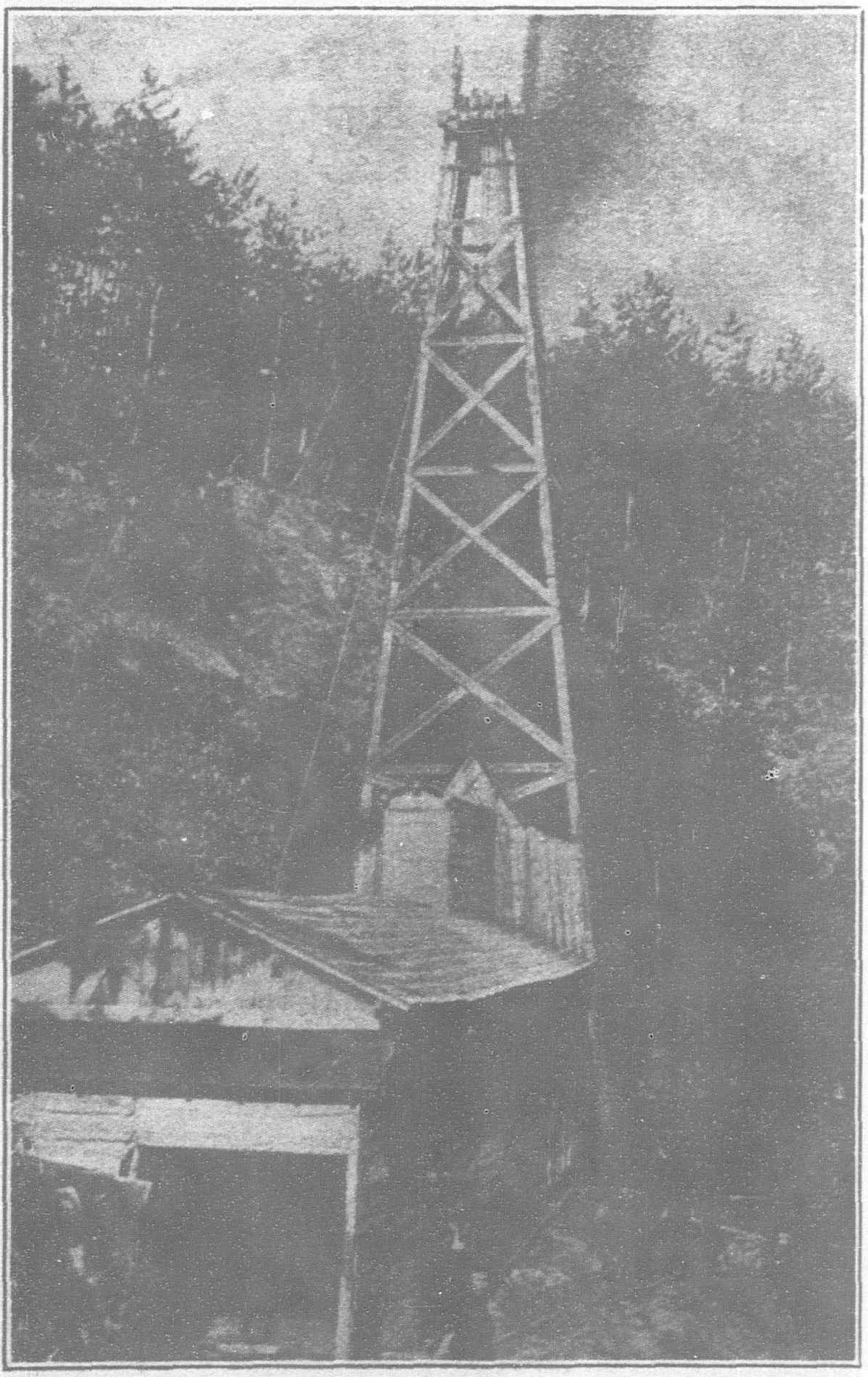


The Torikoya Field, Niigata, of the Great Japan Petroleum Company



An Oil Tank Station of the Nippon Oil Company

From 1877 to 1907 the Japanese kerosene oil industry developed rapidly. Then it was readjusted, and the output decreased slightly. In 1912 the rotary system was introduced, and having proved most suitable for this country, the yield again increased. In 1914, a great well sunk in Akita prefecture gave daily 10,000 *koku*, which added very much to the total output. The late war caused a diminution owing to a shortage of iron tubes. But the supply has much improved lately and the oil producers have resumed their active operations, which is hoped will result in an increase in the output in the near future. Classified according to kinds, the production of kerosene oil in Japan since 1907 may be mentioned as follows:



The Miyagawa Oil Field

(In Thousands of Boxes)

Year	Volatile Oil.	Lighting Oil.	Light Oil.	Heavy Oil.	Lubricating Oil.	Total.
1907 ...	179	2,790	1,324	2,875	481	7,580
1908 ...	21	2,733	755	2,399	528	5,438
1909 ...	79	2,839	820	1,440	495	5,638
1910 ...	51	2,108	972	1,630	578	5,342
1911 ...	19	2,242	811	1,458	794	5,326
1912 ...	45	2,255	841	1,285	794	5,326
1913 ...	89	3,016	772	1,253	876	6,008
1914 ...	240	3,003	1,044	1,584	968	6,839
1915 ...	227	3,022	968	4,068	1,015	9,301
1916 ...	427	3,020	1.565	4,477	1,028	10,520
1917 ...	561	2,366	2,093	3,130	1,692	9,781
1918 ...	630	1,399	2,264	2,114	1,828	8,237
1919 ...	663	1,174	2,214	1,340	1,657	7,039

The demand has not been met entirely by domestic products, and a quantity of foreign oil has been imported, the following showing the imports since 1910:—

(In Thousands of Boxes)

Year.	Crude Oil.	Volatile Oil.	Lighting Oil.	Light Oil.	Lubricating Oil.	Total
1910 ...	1,081	66	6,896	78	210	8,334
1911 ...	988	159	6,366	95	214	7,824
1912 ...	335	224	5,681	134	315	6,690
1913 ...	351	29	4,817	168	274	5,641
1914 ...	249	178	3,545	88	263	4,325
1915 ...	476	107	3,435	122	258	4,401
1916 ...	274	70	2,227	160	288	3,020
1917 ...	334	113	1,942	116	220	2,728
1918 ...	127	275	2,327	117	473	3,320
1919 ...	251	266	3,735	176	325	4,755

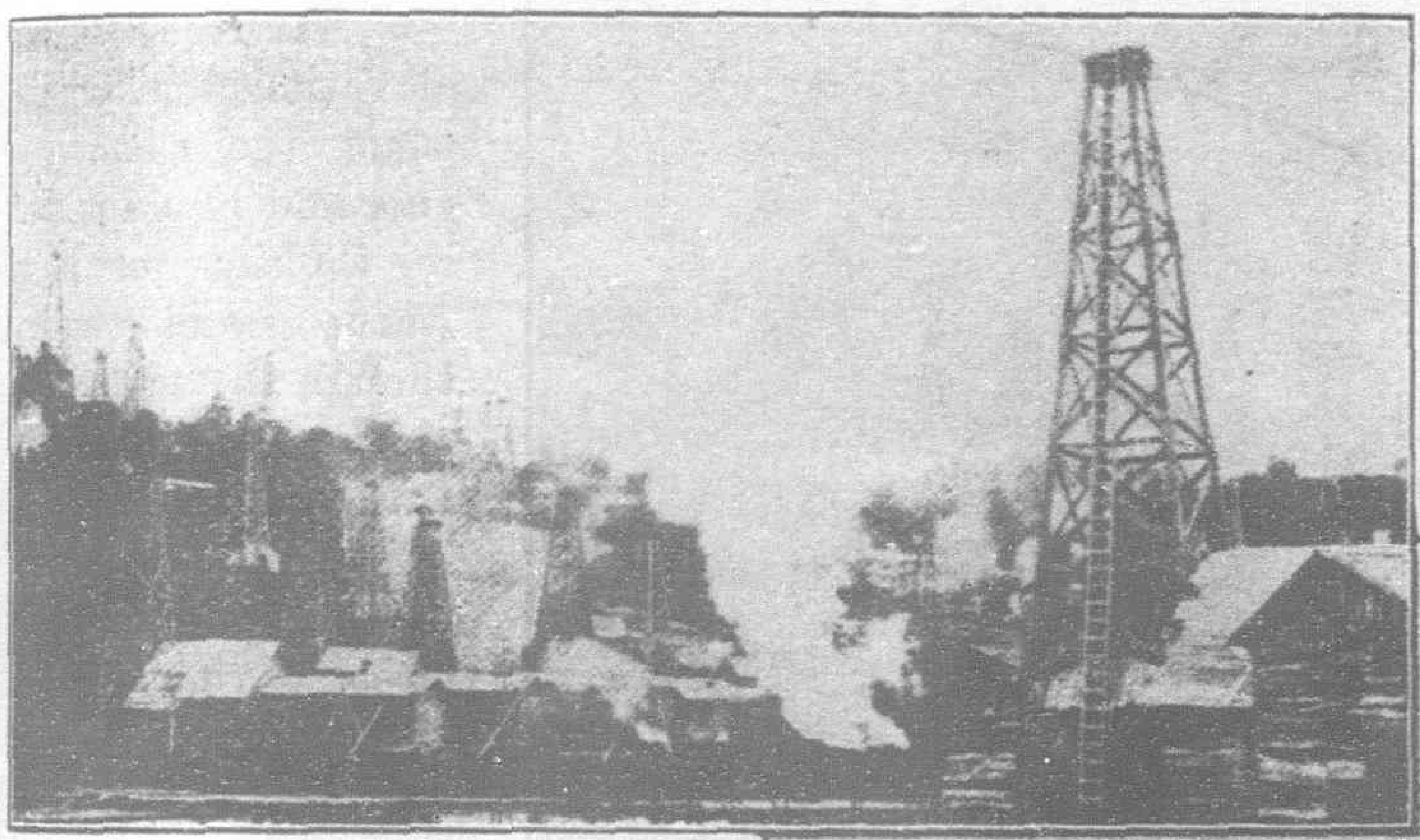
From the above-mentioned tables, we can learn the amount of crude oil consumed in Japan. It may be also seen that the demand for lighting oil, which amounted to 9,000,000 boxes, including both foreign and Japanese, for 1910, fell off gradually until 1919, when it amounted to 4,900,000 boxes, owing to the extensive use of electric light. At the same time, volatile oil has been imported in increasing quantities of late years to cover what was not satisfied by the domestic output, which has been also largely increased. Volatile oil has been produced from natural gas in Niigata, Akita and other places, but the output is limited at present and the future supply is not likely to supply the ever growing requirements for motor-cars and the bean and rubber industries. This will necessitate the importation of foreign volatile oil for years to come.

The demand for light oil for fishing motor-boats has also greatly increased and reached in 1919 a volume nearly twice as great as for 1910.

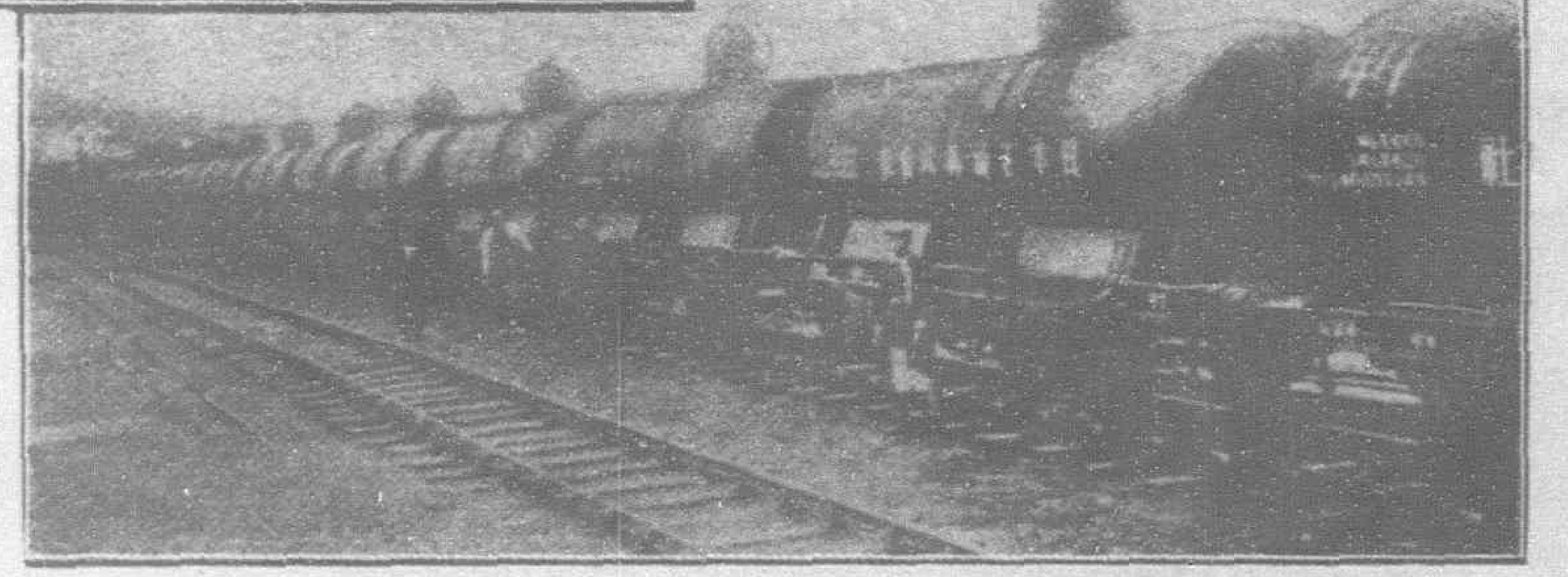
Lubricating oil has increased most steadily in demand, and for 1919 the demand was two and a half times the figure for 1910.

Finally, heavy oil which is most valuable as fuel for warships and merchantmen has been brought from America and the Dutch-Indies, but the exact amount imported is not known. It is said that the demand for it is about 300,000 tons a year.

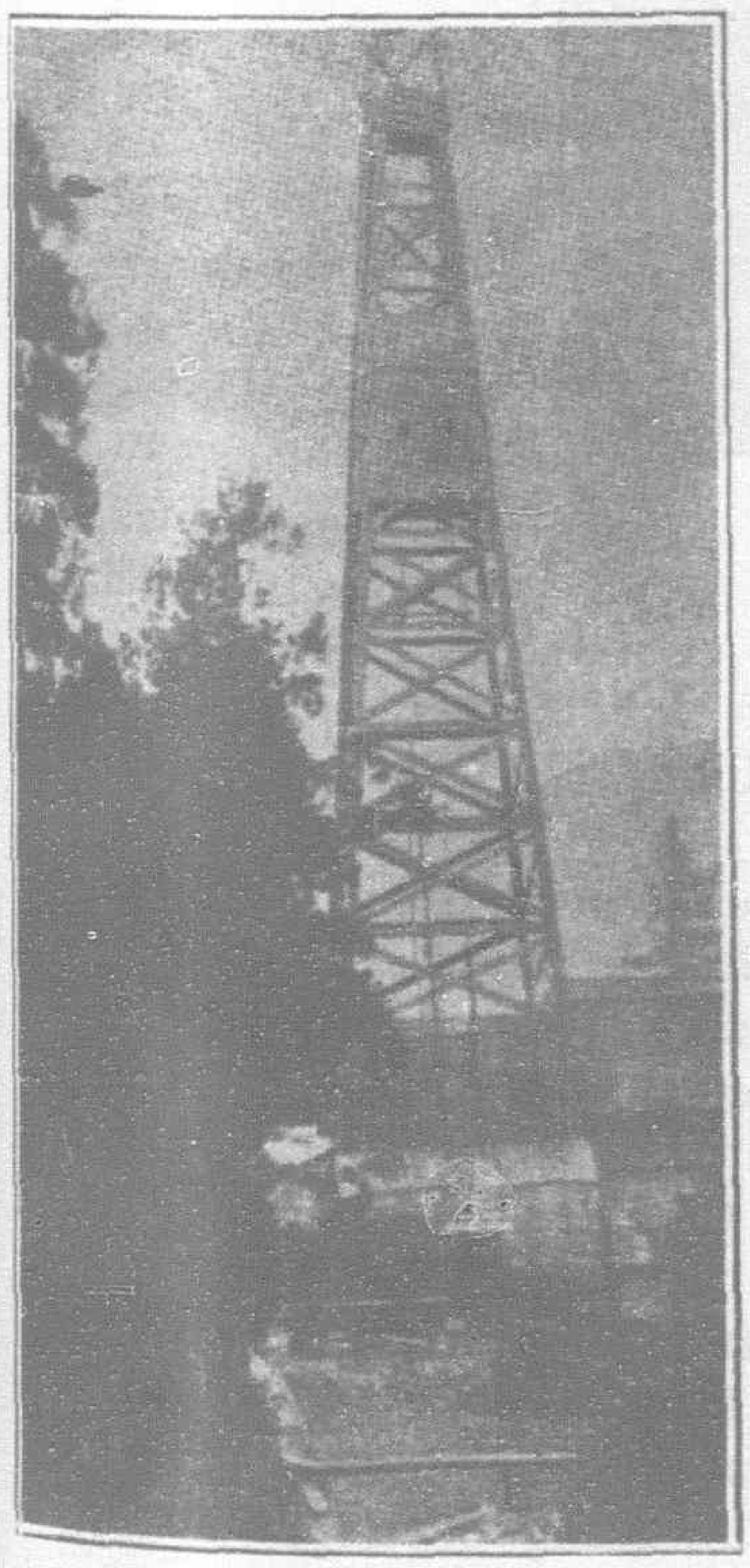
The Japanese demand for all kinds of oil is increasing in much greater quantities than the growth of the domestic supply, but the writer holds that this is no cause for pessimism. Japan possesses an area of oil deposits so large in proportion to her total area as to surpass by far the proportion between both areas in the United States. There is need of improved methods of prospecting, but the work will entail much difficulty and considerable expense. The navy expended a sum of Y. 200,000 for a well of 3,000 feet in Formosa. Such a heavy expenditure for prospecting cannot be met even by a big company, much less by an individual. It is therefore desirable that the government should undertake an exhaustive geological survey so that the oil may be mined most economically and properly.



The Kamada Field of the Nippon Oil Company



Tank Cars of the Nippon Oil Company



Rotary Well Boring Plant at Torikoya Oil Field

Supplementing the information above recorded is this from the pen of Mr. A. P. Scott, managing director of the Rising Sun Petroleum Co., Ltd, an extract from an article on "The History of Oil in Japan" printed in that very interesting book "Present Day Impressions of Japan"

"In 1911 the total production of crude oil in Japan had decreased to 1,550,000 *koku* per year as against 1,830,000 three years before, and the future of the Japanese oil industry was viewed with pessimism. The cause of the decrease of production was that the shallow wells were gradually dying out, and deep wells digging takes a long time and is accompanied by many difficulties. However, the importation of a new and powerful rotary drilling machine by the Nippon Oil Company, from America, with four mechanics, threw new life into the Echigo oil-fields. The efficiency of the new rotary machine was so great that it drilled from 120 feet to 180 feet, per day of 24 hours, in the Nishiyama fields, and only two or three months were required to drill a well that would need one or two years' drilling by the rope system. One well drilled 3,300 feet in only 80 days and struck oil. The first rotary drilled well of 2,880 feet was commenced on April 5th and completed on June 23rd, and gushed 100 *koku* per day. Encouraged by these successes, the Nippon Sekiyu Kaisha installed rotary machines at Kamada, Takiya, Nagamini, Gochi and Niitsu, and these met with good results. Then the Hohden followed the example, and ordered rotary machines from America. The new machine was installed at Iriwada field, in Nishiyama district. Many others began to use rotary machines. Not only did the new machine do wonderful service itself, but it served as a stimulus to the old rope system, and the latter was much improved, and increased in efficiency. The continued prosperity of the Nippon Sekiyu Kaisha decided them to increase their capital from Y.10,000,000 to Y.20,000,000.

"In September 1921, No. 71 rotary drilled a well at Imo field, and at a depth of 443 feet struck oil, which gushed out at a rate of 600 *koku* per day. About the same time another rotary well at Kamada struck gas and blew out 6,000,000 cubic feet of gas per day. These two wells, one oil and the other gas, were then the biggest on record in Japan. The total production of crude oil in 1913 increased to 1,750,000, as against 1,470,000 in 1912.

"One of the most remarkable occurrences in the annals of Japanese oil history is that the Nippon Company's No. 5 rotary well at Kurokawa field, Akita district, struck an extraordinarily big oil deposit. The well began gushing at midnight on May 25th, 1914. By the test made at nine in the morning it gushed at the rate of nine *koku* per minute, or 12,960 *koku* per 24 hours. (One *koku* is about 47 gallons. Ed.) This Kurokawa field is at a distance of four *rin* from Akita town, and dating from very ancient times there have been oil indications. Crude cozed out of the ground and floated on top of the stream—perhaps this is why the place is called Kurokawa, or 'Black' stream.

'The news of the gushing spread all over the country at once and caused a sensation. Everybody rushed to buy shares in the Nippon Oil Company, and the prices advanced by Y.22 per share in one day! The confusion in the Tokyo Stock Exchange market became so uncontrollable that they were obliged to suspend transactions temporarily.

"The Nippon Oil Company had good luck at the Kurokawa oil-fields. There were few wells that failed. After the great gushing of No. 5 well, the No. 8 was the next largest, putting out 5,000 *koku* per twenty-four hours."

In his article Mr. Scott has dealt with the question of Japanese oil companies at some length because, under present conditions of a decreasing consumption the native production naturally remains the keynote to the oil market of Japan. The operations of the importing companies, The Rising Sun Petroleum Co., Ltd., and the Standard Oil Company, he has dealt with briefly, as, while they both have detailed organizations, the sphere of their activities is, of course, affected by the decreased consumption and increased production of the country.

Taking the annual production of crude oil in Japan at 100,000,000 gallons per annum, valued at from Y. 4 to Y. 5 per unit of ten gallons, in the open market, it will be seen that the industry is an exceedingly valuable one.

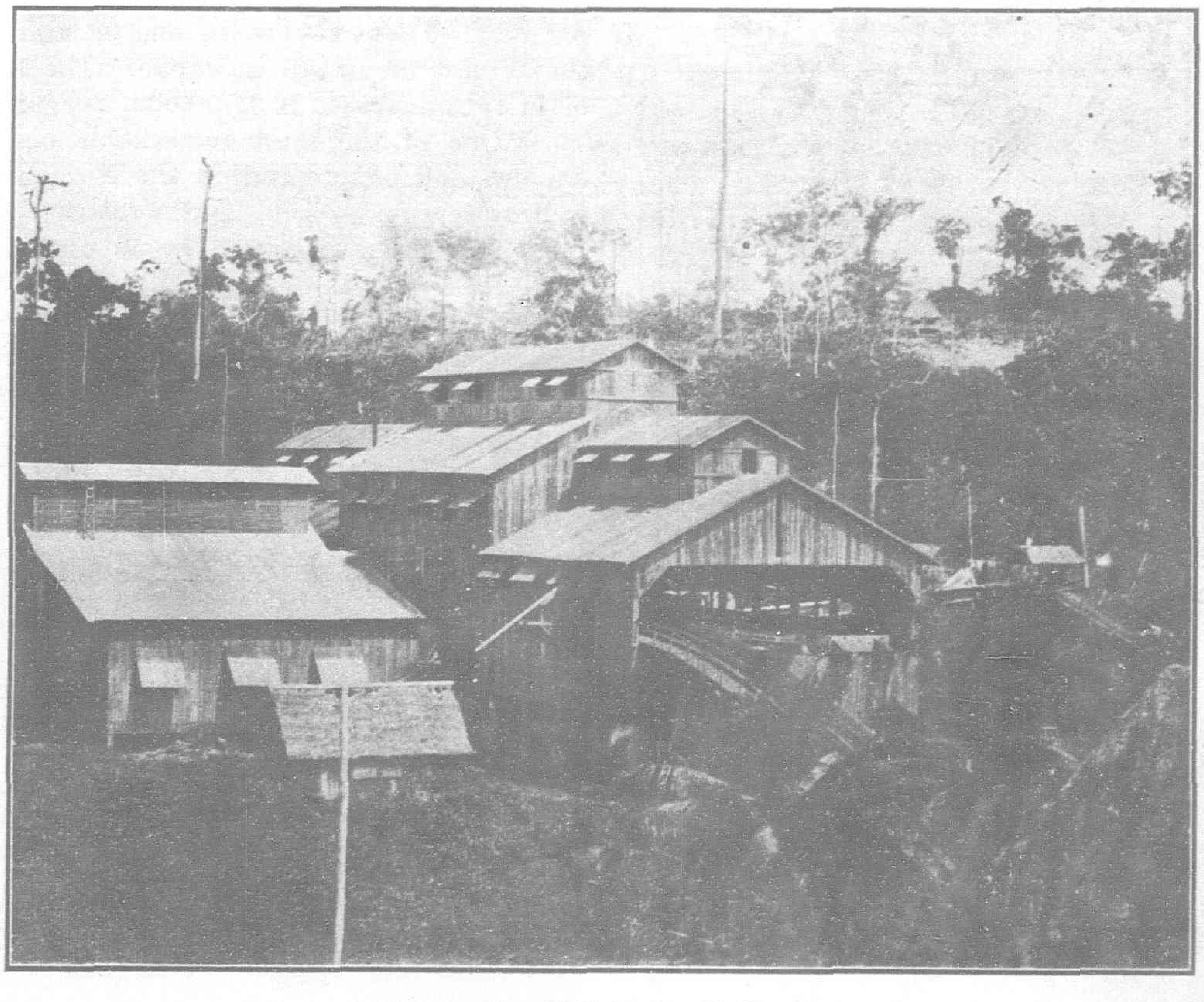
MINDANAO

Cotabato: Its Natural Resources and Opportunities for Development

By P. J. WESTER, Agricultural Advisor

THE province of Cotabato occupying the major part of the huge peninsula that lies between the Celebes sea on one side and washed by the Davao Gulf and the Pacific Ocean on the other, is bounded on the north by Lanao and Bukidnon, on the east by Davao, and on the south and west by the Celebes Sea, and contains an area of 9,620 square miles, being by far the largest province in the Philippines. Cotabato is three times as large as Porto Rico less 1,247 square miles, which has an area of only 3,604 square miles and it is about a third larger than the Hawaiian Islands, which contain 6,406 square miles.

Of this large territory, 78.7 per cent., 1,960,530 hectares, is covered by commercial forest, 2.9 per cent., or 72,640 hectares is open grass lands; there is less than 2 per cent., of the land in mangrove swamps and noncommercial forests, while 0.6 per cent., or less than 15,000 hectares are in cultivation. Some of these figures are subject to correction, since there are 16 per cent., or 402,880 hectares of land that still remains unexplored.



A Modern Saw Mill in the Philippines

Except the comparatively small area that drains into Sarangani Bay and the unexplored region on the southwest, the entire province is one vast basin of the Cotabato River and its numerous tributaries. The Cotabato River, under the name of Pulangi, originates in northern Bukidnon and is probably the longest river in the Philippines. This river is navigable for small steamers to Fort Pikit, 74 miles from the sea, nearly all the year around, and at medium high water to Kabakan, a distance of more than 100 miles from the coast.

As one ascends the Cotabato River, the highway of the province, for several miles from the coast the banks, barely above tide water, support a vegetation of mangrove and other salt water plants. Further inland, as they rise to a higher level beyond the influence of salt water, the vegetation changes to tall grasses with here and there clumps of shrubby trees and sago palms. As the river leaves the fresh water swamps of the interior at Tumbao it branches into two arms and forms a delta country to the coast, penetrated by numerous cross channels.

Already before Cotabato, the capital of the province, is reached, a few tall coconut palms make their appearance on the low river banks. Here and there small Moro villages are passed clustering on the top of the river bank, the houses themselves scarcely visible through the thick growth of bananas and other fruit trees by which they are surrounded. Striking kapok and bangar trees meet the eye from time to time. The stately bauno is scarce, and so is the handsome, round topped, leafy inogug. Altogether, the lower part of the river is a flat, monotonous country of but little interest to the sight-seeing tourist.

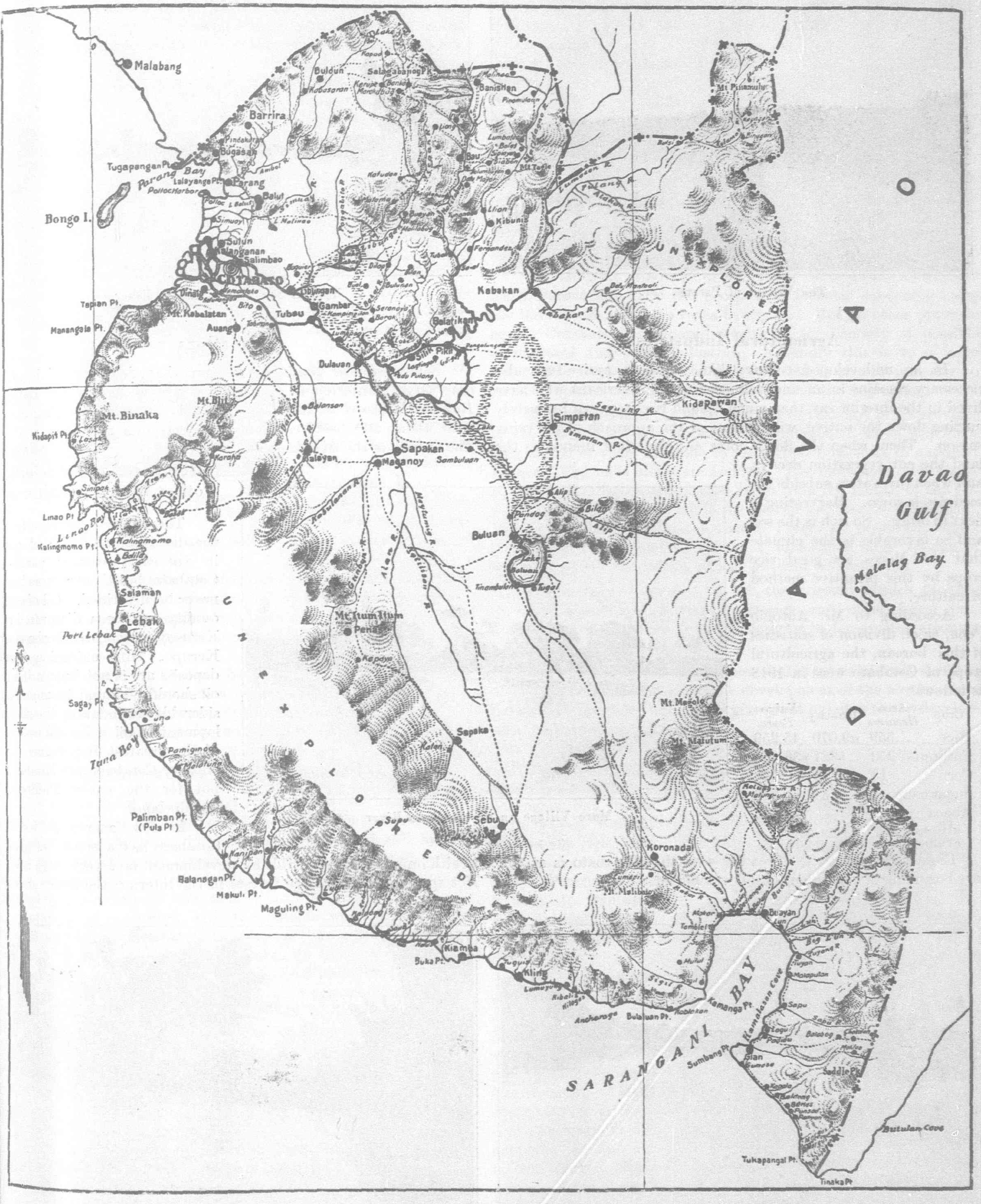
Mango trees are common and the stiff Buri palm is a common feature in the landscape. The spiny bamboo also is well introduced. To the duck hunter certain sections in the swamps are a paradise. Crocodiles are common in the rivers and swamps.

At the higher elevations and on the coast the climate is cool and pleasant, but in the interior it is warm and sultry though the nights are almost invariably cool and agreeable. Rainfall observations are all too scant over the large territory under discussion, but so far as they are available they show a well distributed and ample rainfall with no prolonged dry periods.

Population

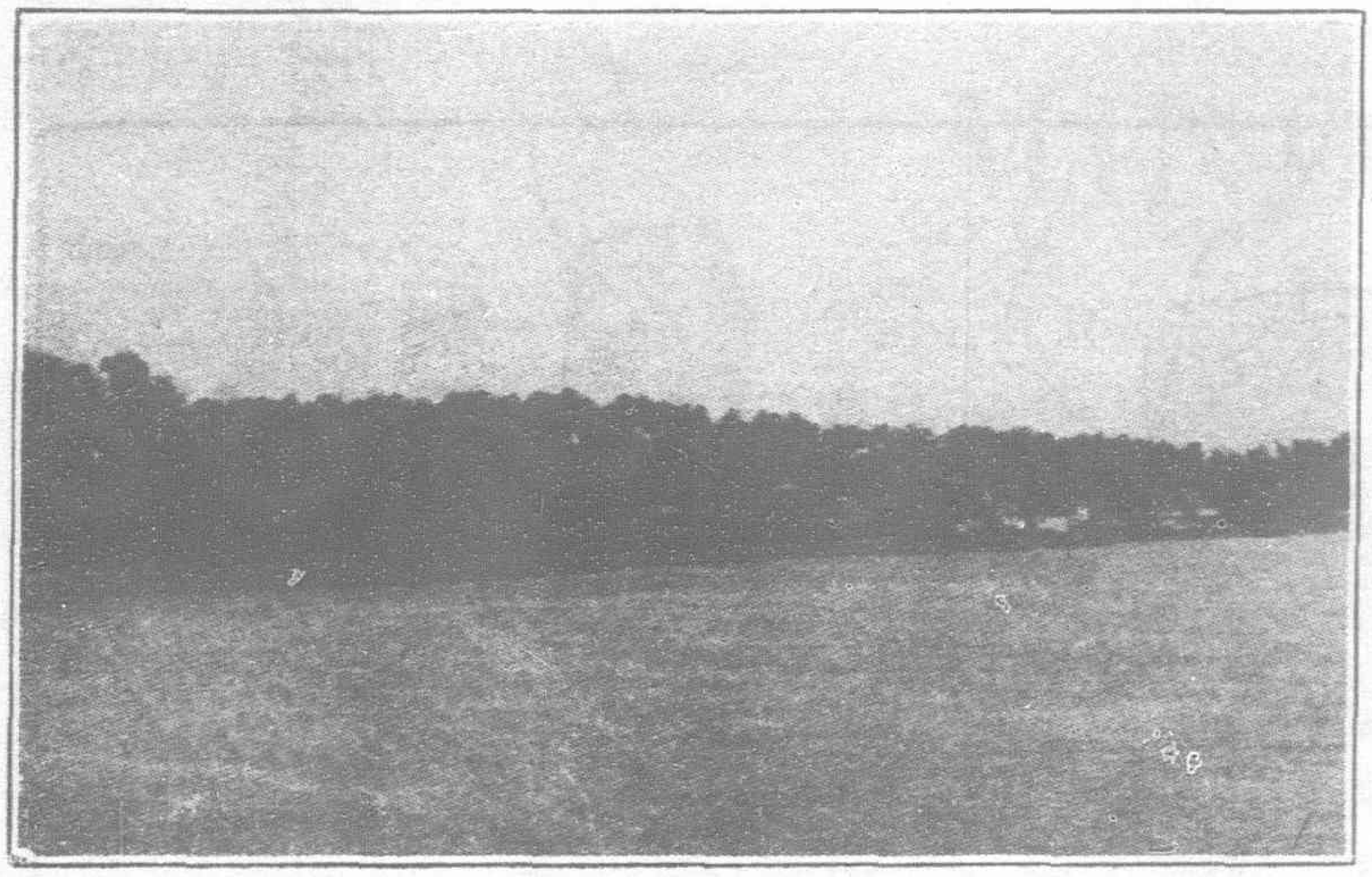
The population of Cotabato numbers 154,270, divided among Moros, Manobos, Bilans, Tirurays, Tagabilis, Dulangans, and Christian Filipinos, and a few scattered Americans, Chinese and Japanese, but by far the greater number of the inhabitants in Cotabato are Moros, belonging to two tribes, the Maguindanaos and the Iranuns. These people are widely scattered through the Cotabato Valley, and are the most advanced in civilization among the native inhabitants. Next in importance are the Manobos, who have settlements here and there in the more remote districts. The Bilans and Tirurays comprise several thousand people also living in the remote parts of Cotabato. The Tagabilis and Dulangans are very few. The Christian Filipinos live around Parang Bay and about Cotabato. Then there are quite a number who have been settled in agricultural colonies from Fort Pikit to Silik and at Glan within the past few years.

At present labor is plentiful at the few plantations that have been started, but corporations initiating development work of any magnitude would almost immediately be confronted with the problem of importing labor.



MAP OF COTABATO PROVINCE

MINDANAO



The Village of Parang, 1919

Typical Scene on Cotabato River

Agricultural Industries

In an undeveloped country like Cotabato agriculture also necessary remains in an undeveloped state. Americans who have lived in the interior say that much upland rice is grown by merely cutting down the native, wild grasses at the approach of the rainy season. Then, when the floods come and the river inundates the land the cut vegetation decays, and when the waters subside the seed rice is sown. Harvesting is next in order. So rich is the soil and so favorable is the climate that the Moros get good rice crops by this primitive method of culture.

Moro Village on the Cotabato River

According to Mr. Antonio Peña, chief, division of statistics of this bureau, the agricultural crops of Cotabato were in 1918 as follows :

Crop	Area *Hectares*	Quantity	Value *Pesos*
Rice	...559	*a*9,070	45,259
Coconuts	350	*b*321	*c*36,660
Corn	... 13	*a*123	739
Sugar cane	7	*b*4	306
Abaca	... 2		306

*a*Hectoliters. *b*Copra, tons.
*c*Value of all coconut products

From these figures it is readily seen that Cotabato is at the very beginning of her agricultural development.

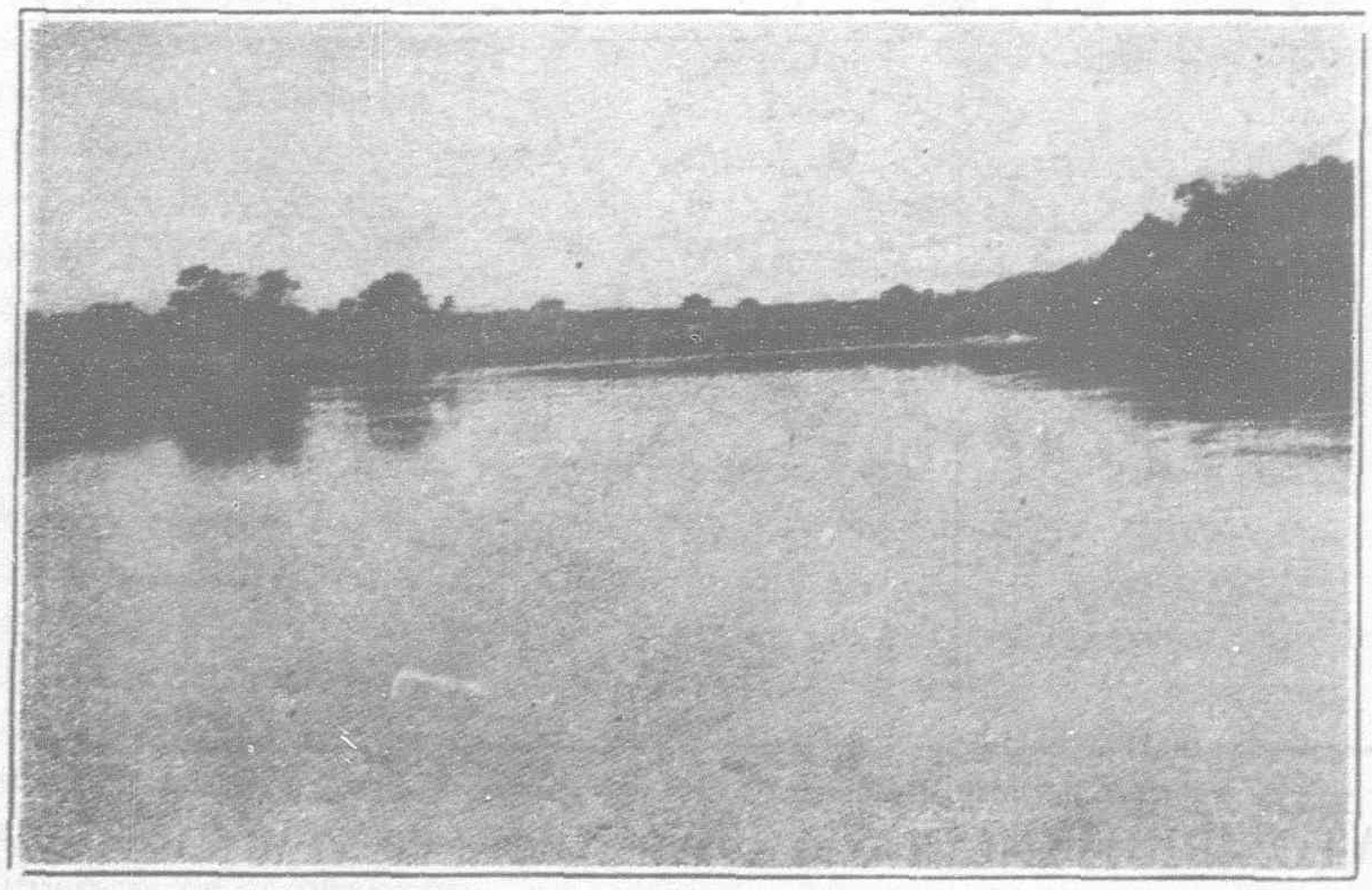
Plantations

Several smaller plantation ventures have been started but the only large plantation in operation at present is the Rio Grande Rubber Company at Kabakan, which is 1,024 hectares in extent, with about 200 hectares planted to coconuts and Para rubber. The growth of the trees is good.

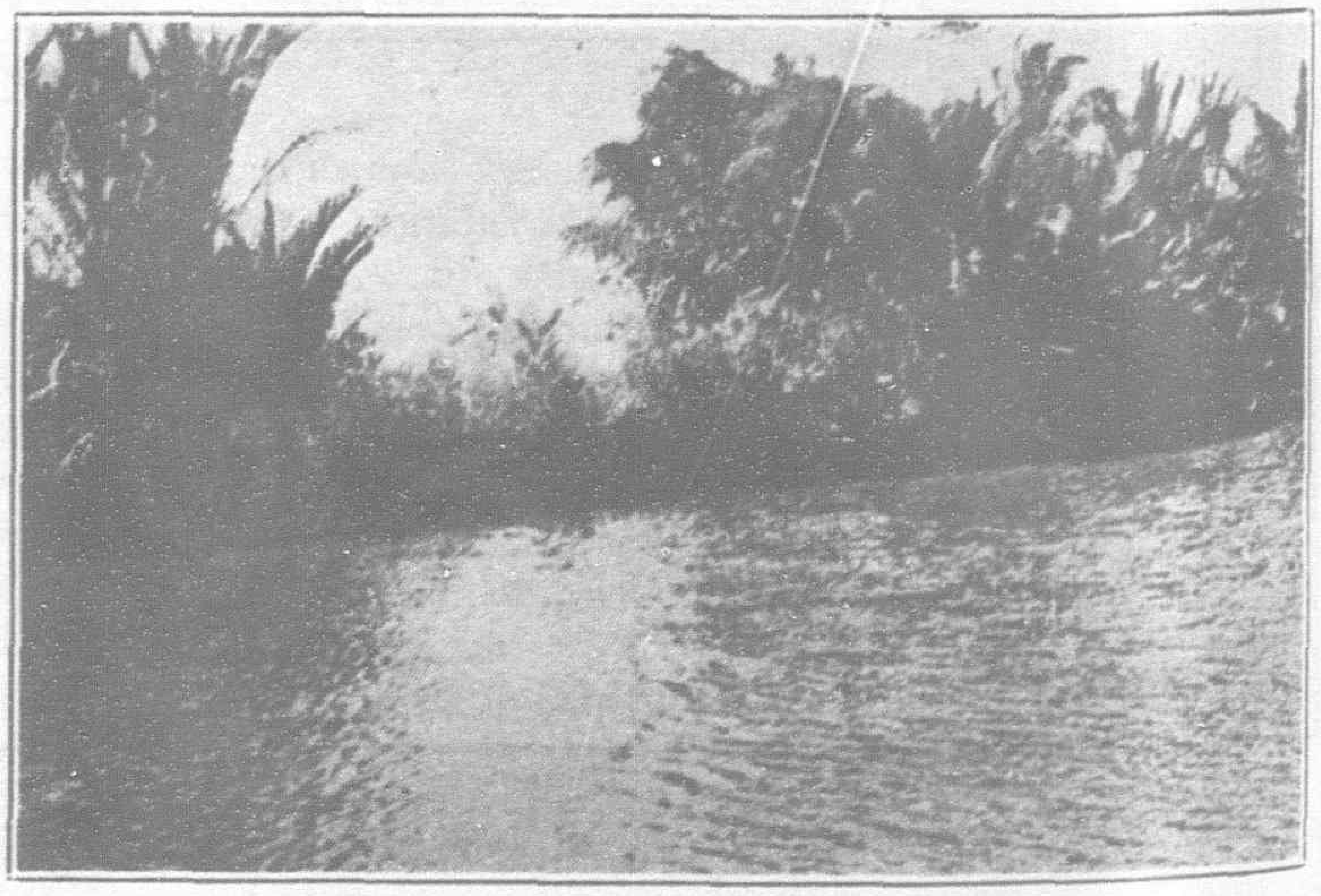
Resources and Products other than Agricultural

There are vague reports of the discovery of coal and gold in the north-eastern part of Cotabato, but these rumors have never been verified. Oil of good quality has been discovered at Kerusoy in the neighborhood of Kerupe. How extensive these deposits are is not known but if oil should be found in any considerable abundance, the development of oil wells will become of the greatest importance not only for Cotabato and Mindanao but for the entire Philippine Archipelago.

In her enormous forests Cotabato has a source of great wealth immediately available for development on a very large scale. Not speaking of the large forests in the interior, the large, almost



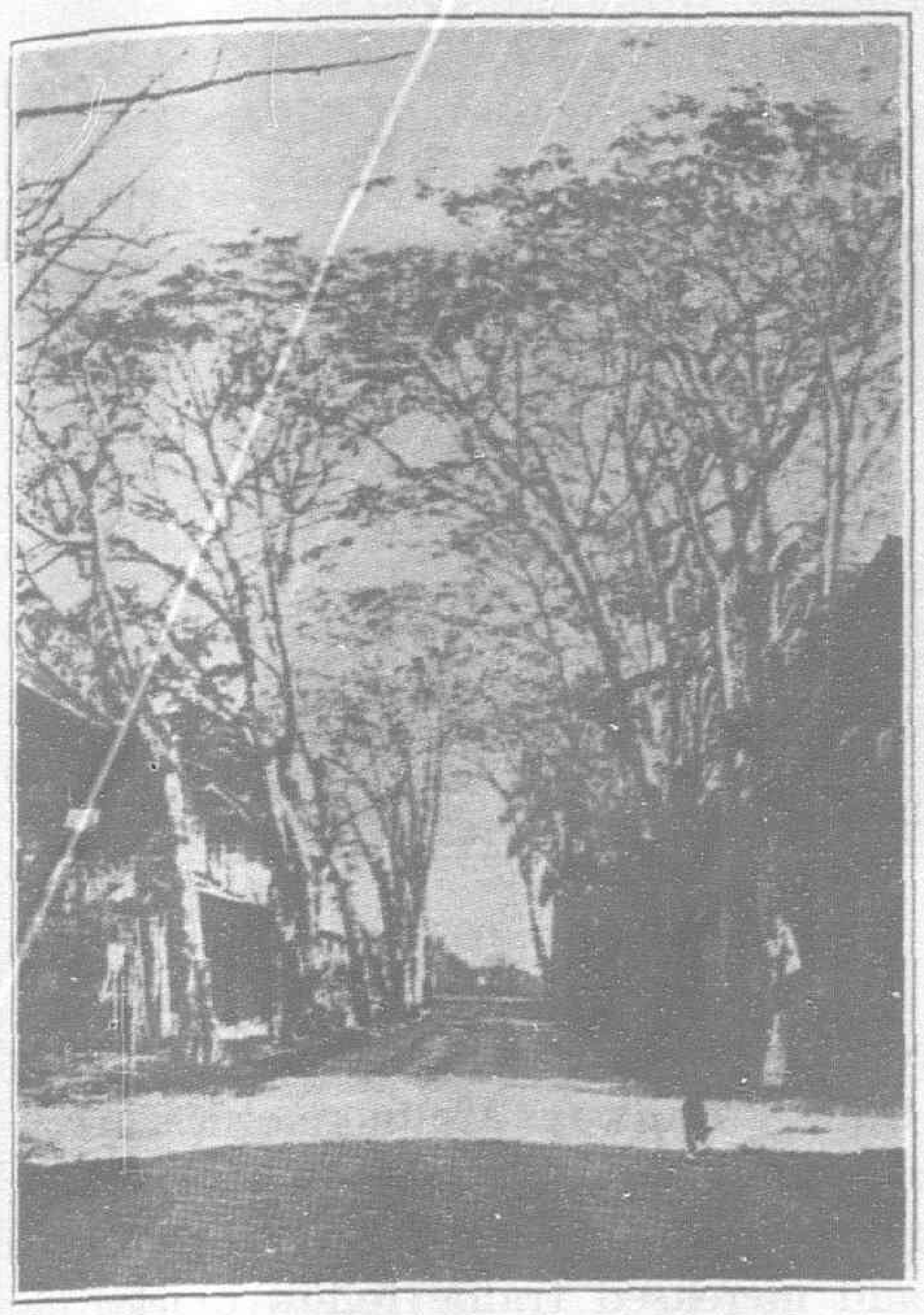
View of Cotabato River



Sago Palms in the Cotabato River

SOME VIEWS IN MINDANAO

entirely unexplored mountain range on the southwest coast from Mount Kabalatan to Sarangani Bay, a distance of some 200 kilometres, forms a solid, broad belt of commercial forests containing both hard and soft wood. Among other trees the following species of timber trees are found in the Cotabato forests: Bagtican, *Parashorea plicata* Brand; white lauan, *Pentacme contorta* M. and R.; guijo, *Shorea guiso* Bl.; lumbayao, *Tarrietia javanica* Bl.; calantas, *Toona calantas* M. & R.; camagon, *Diospyros discolor* Willd.; ipil, *Intsia bijuga* O. Ktze; narra, *Pterocarpus indicus* Willd.; acle, *Albizzia acle* Merr.: tindalo, *Pahudia rhomboida* Prain, and *Intsia acuminata* Merr.; kalamansanai, *Neonauclea* sp.; ebony, *Maba buxifolia* Pers.; kamuning, *Murraya exotica* L. and palomaria, *Calophyllum inophyllum* L.


Street in the Town of Cotabato

At present three sawmills are in operation in the province, one large mill in Lebak and two smaller ones in the town of Cotabato.

Some almaciga, gutta percha, besswax, lumbang nuts and bejuco are gathered in the forests and marketed, but the quantities obtained could be multiplied again and again, and tanbark in large quantities could be obtained for export from te mangrove swamps on the coast.

The hills south of Cotabato from Tamontaka to Awang contain a sticky, plastic clay which on investigation may be found of value for the manufacture of pottery, tiles and bricks.

The waters on the coast abound in fish of excellent quality.

Communications and Transportation

The almost total lack of good roads is not the hardship one might suppose since the Cotabato River and its many tributaries are navigable for launches far into the interior and still farther inland are negotiable by barotos. For this reason most settlements are located on the rivers. Overland transportation is handled by means of pack animals.

Cotabato is connected with the outside world through the wireless station in Malabang, Lanao, and has a local telephone system connecting the principal towns in the province. The steamers *Fernandez Hermanos*, *Neil McLeod* and *Mindanao* from Manila, call at Lebak and Cotabato at irregular intervals, and the steamship *Tablas* makes monthly calls at both points. The river steamer *Hall* makes regular trips on the Cotabato River as far as Fort Pikit and Kabakan and makes occasional trips to Parang and Lebak. The *Research* makes irregular trips from Zamboanga to Cotabato.

Trade

The following table shows the exports from Cotabato from 1914 to 1918. From this it may be seen that lumber and rice are the only products of importance:—

	1914	*1915*	*1916*	*1917*	*1918*
Lumber ...	P213,747	P2,700	P153,788	P241,628	P240,047
Rice	185,975	54,362	110,099	134,387	105,624
Copra	7,183	4,556	8,173	41,420	29,436
Carabaos ...	—	—	—	—	13,220
Mats	—	1,104	—	820	12,565
Abacá ...	3,268	766	1,280	18,162	7,196
Peanuts ...	554	1,487	3,659	4,291	6,160
Palay (rough rice) ...	43,691	11,660	5,521	6,595	4,419
Fowls	—	—	—	12	4,328
Hides	324	742	—	240	2,244
Rice Bran ...	2,944	747	446	1,677	1,777
Lumbang nuts	1,438	1,455	1,482	1,628	1,094
Miscellaneous	—	—	—	—	—
Total ...	459,124	79,579	284,448	450,860	428,110

Prospective Industries and Future Development

The different provinces in Mindanao each possess individual features that appeal to the prospective investor depending upon the industry in which he seeks to engage. But no other province equals Cotabato in potential wealth or in diversity of possible agricultural and other industries. Naturally this is to a large extent due to the size of the province, but is also in part due to its geographical and geological features and the vegetation.

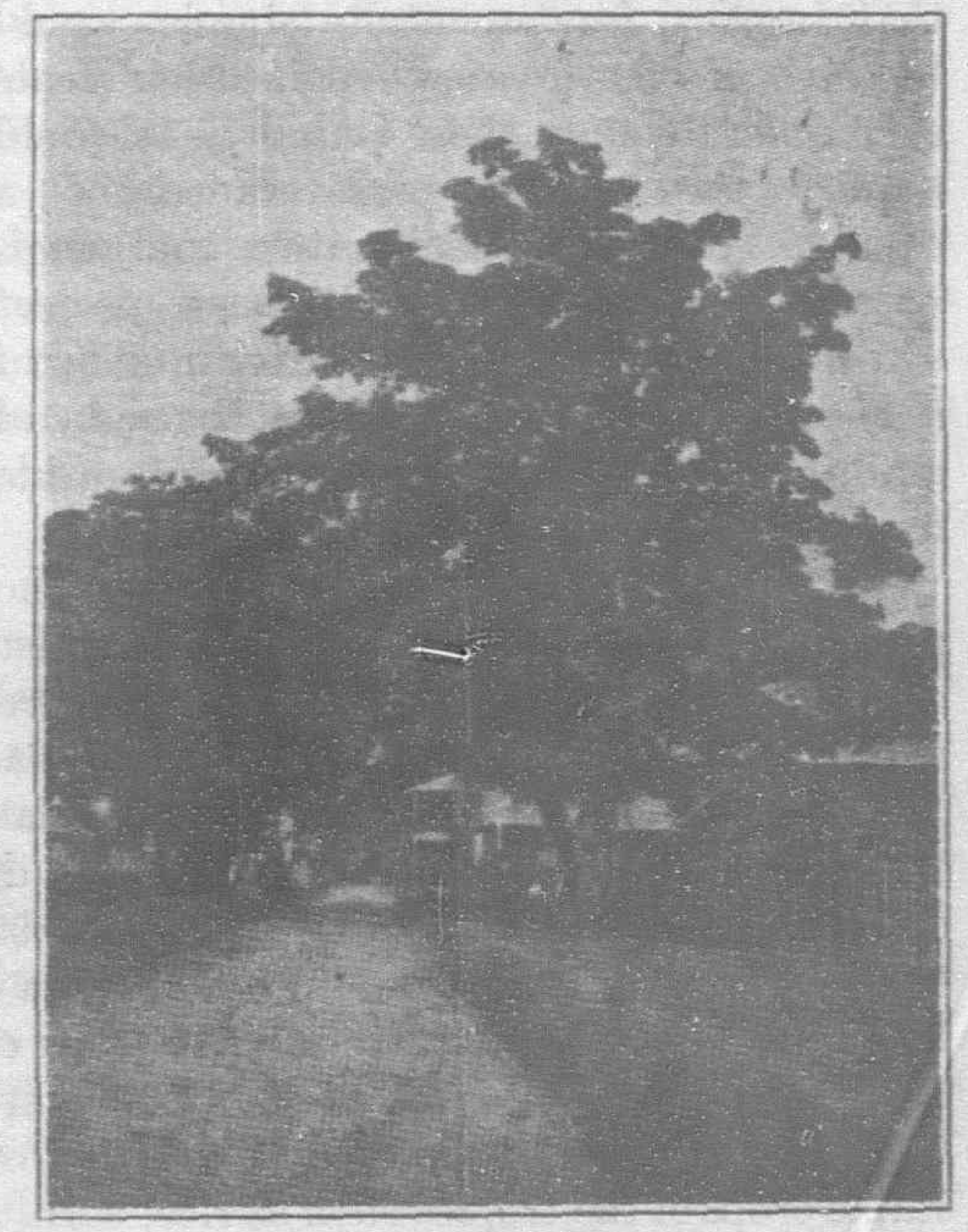
With a larger area in commercial forests than any other province in the Philippines, as yet practically untouched, these will for a long period of years continue to yield great quantities of excellent timber. The mills alone are lacking. The more accessible forest is, of course, that on the coastal range from the mouth of the Cotabato to Sarangani Bay, but in the interior the Cotabato, Libungan, Maridigao, Malitabug and Kulaman Rivers all penetrate virgin, commercial forests and they have a sufficiently large volume of water to permit the rafting of logs incident to lumbering.

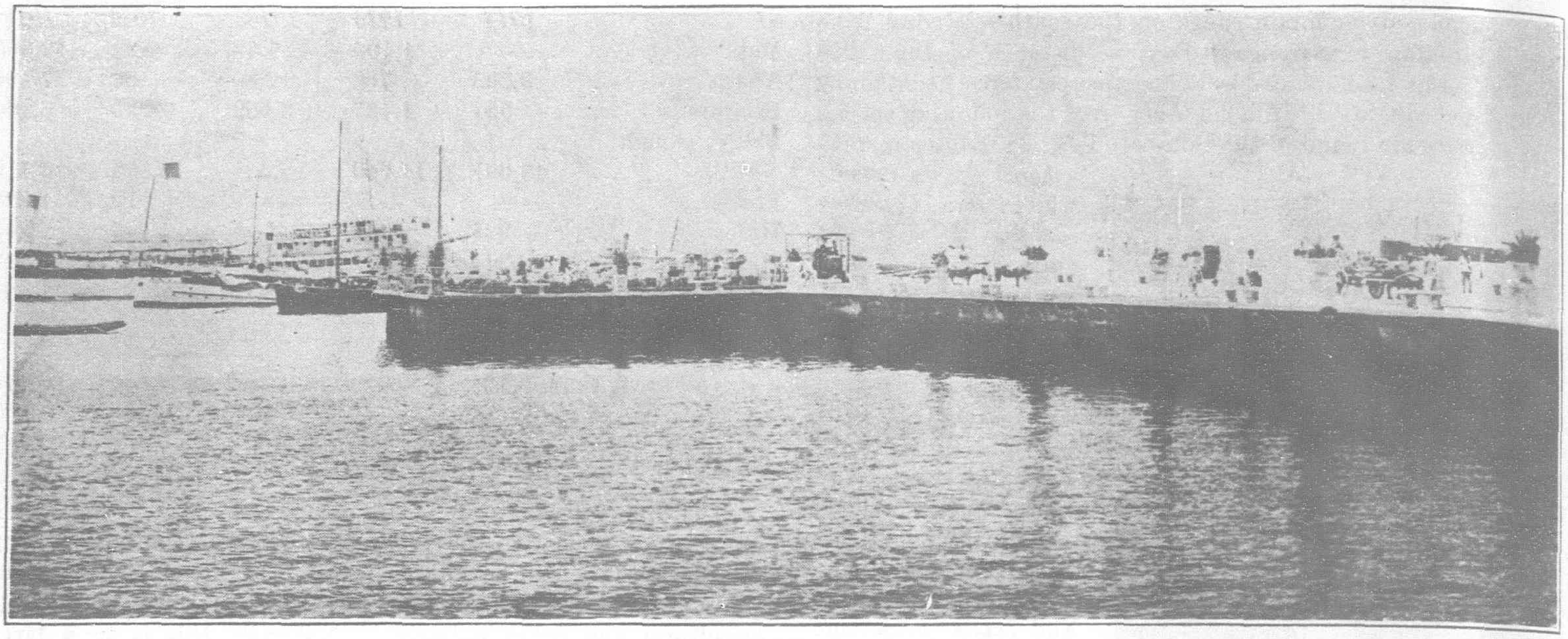
The mangrove swamps on the coast would furnish tanbark in large quantities. Rattans, almaciga and other forest products could be obtained from the interior in far greater amounts than at present.

The materialization of the hopes relative to the oil finds would be of the greatest significance in the development of the northwestern part of the province, and would give great impetus to the development of Parang into a great shipping point.

On the big, open, grassy plains, between Sarangani Bay in the south to lake Buluan, and on the rich, hilly pastures in the north from Parang over Buldun, to Banisilan and Bukidnon there is room for large cattle ranches.

At the lower elevations the soil and climate are favorable for the production of abacá, coconuts, coffee and rubber over very large areas. Wide stretches of country continue suitable for coffee as one ascends to the higher plains north of Cotabato River, and here tea would also undoubtedly succeed well in many districts. With tractor cultivation upland or unirrigated rice could unquestionably be produced in great quantities and sugar haciendas could be opened up that would dwarf all previous similar undertakings in the Philippines into insignificance.

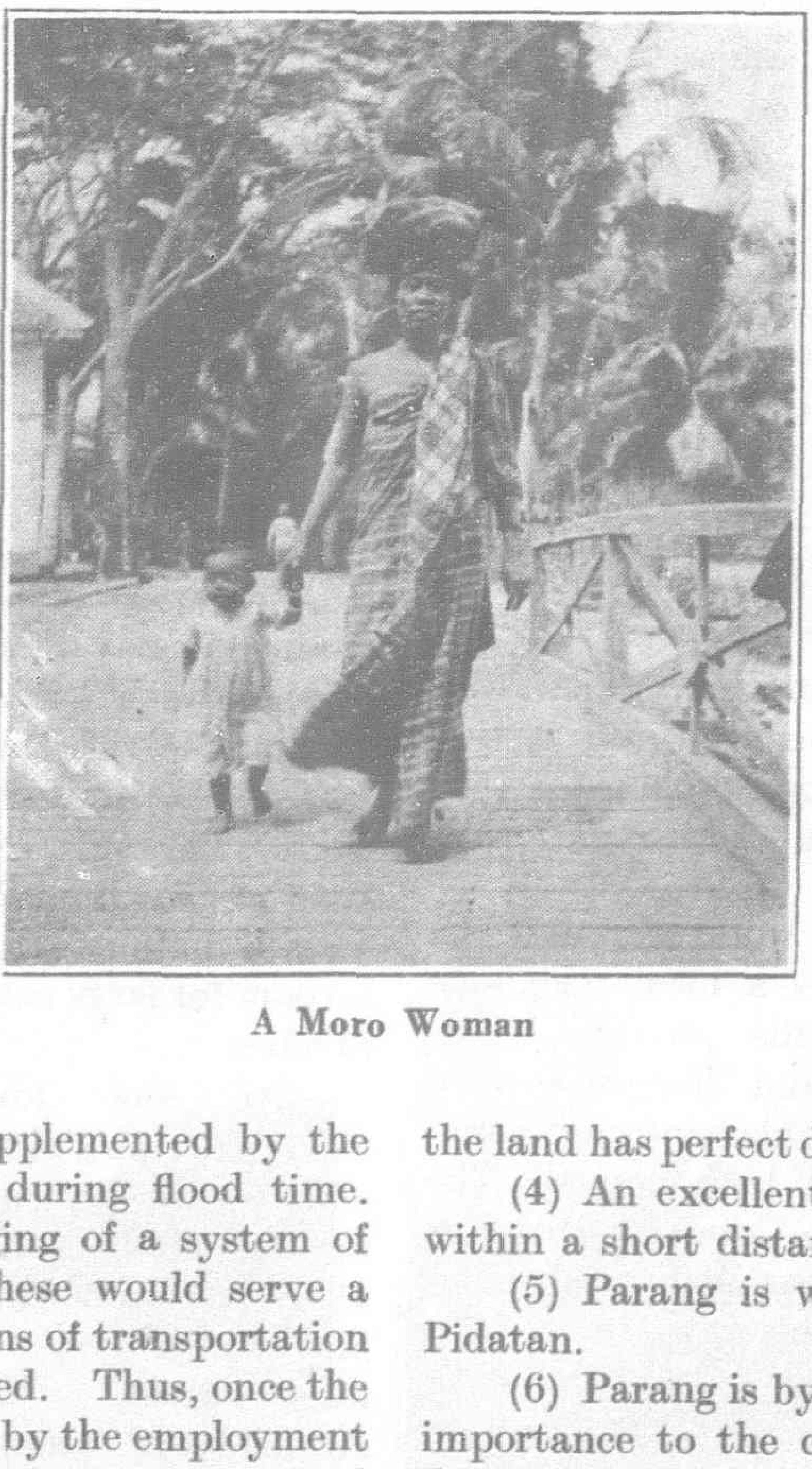

Another Street Scene in Cotabato



Zamboanga Dock, Zamboanga Province

Then, there is the delta country, the land subject to the overflow of the Cotabato River and its tributaries and the adjacent swamps, the soil of which is inexhaustively fertile.

Due to the ever present menace of inundation very little land can safely be farmed at present along the lower reaches of the Cotabato and Libungan. A region of exceptional potential wealth, it is at present a barren waste serving as a breeding ground for malarial fevers, it is a menace to health, and it bars the ready access to the more elevated, fertile country beyond. But it presents equally exceptionally vast opportunities for achievement and exploitation. The project might be financed by the national government, but a concession granted to a large corporation would probably be preferable, as that would insure more rapid development. In any event the taming of this country with all that implies, fundamentally simple, would be one of the greatest engineering feats ever undertaken in these Islands. It would require the patient perseverance of a capable staff of administrators and engineers for many years. It is a project sufficiently vast to tax executive ability of a high order, and to fascinate the man of ambition, with a desire to achieve, aside from the mere monetary returns.



A Moro Woman

The project is a big one, but the problem is simple enough and would consist of the straightening of the rivers to induce a swifter flow of water, in the lower areas supplemented by the construction of dikes to prevent inundation during flood time. The drainage would also necessitate the dredging of a system of canals in the more depressed localities; but these would serve a triple purpose, as they would provide also a means of transportation and a source of water for irrigation in times of need. Thus, once the drainage and canal system was in working order, by the employment of tractors, on this great, level plain any of the important annual staple crops of the tropics such as rice, corn, sugar cane, tobacco and jute, not to speak of indigo, cassava and peanuts, sesame and other crops, could be grown on a, for the Philippines, unprecedented scale.

No country can develop and prosper without a transportation system adequate to handle its traffic and afford good outlets for its trade.

In the development of the transportation system the several large rivers, and the canals in the present swamp region and delta, will unquestionably play a considerable role, but railways will be the greater arteries of trade. Railways are more or less urgently needed elsewhere incident to the development of Mindanao, but nowhere is the need so great, would the road meet less difficulties in construction, and would increased traffic follow quicker than on a railroad extending from Parang along the foothills of the mountains north of the Cotabato delta and the big swamps, over Kabakan and Kidapawan, terminating on Malalag Bay, on the Davao Gulf, with a branch line curving southward east of lake Buluan to Makár on Sarangani Bay. Excepting in the country south of lake Buluan such a road would penetrate during its entire length an agricultural land of unsurpassed fertility, which at present is practically uninhabited, and for all practical purposes is now inacessible from the coast.

There are several good harbors on the Mindanao coast, but no other possesses so many advantages for the location of a great seaport and railroad terminus as Parang Bay. The points in its favor may be summarized as follows:

(1) The bay is large enough to shelter a large fleet of vessels.

(2) There is deep water and excellent anchorage close to the shore, and piers could be constructed at a low expenditure.

(3) The topographical features of the land around the bay for the planning of a large and attractive city are unusually good, the land has perfect drainage and a good slope from inland to the sea.

(4) An excellent and abundant supply of water is procurable within a short distance.

(5) Parang is within 45 kilometres of the oil discoveries in Pidatan.

(6) Parang is by far the nearest good harbor of any prospective importance to the coal field of Malangas—150 kilometres sailing distance.

(7) The approach to Parang of a railroad from the interior of Mindanao does not present any topographical difficulties and it is within easy reach of a very large and fertile country adapted to rice, corn, coconuts, rubber and coffee, and stock raising.

Also, one may confidently look forward to the day when Parang will be the centre of trade and shipping not only of Cotabato province alone but quite possibly of the entire Island of Mindanao.

Industries of Mindanao and Sulu

Forest.—The lumbering industry in Mindanao-Sulu is progressing daily and the existing sawmill companies are constantly endeavoring to increase the capacity of their mills in order to meet the increasing demand for lumber. Transportation facilities have contributed to the development of this industry, there being many ships engaged in transporting lumber.

The bureau of forestry, with the co-operation of the provincial Governments of Mindanao-Sulu, is taking all measures to stop infractions committed in "caingin" making and the stealthy cutting of woods and gathering of forest products.

The tabulation below shows the average daily output since January 1, and the average number of days operated per month for the mills in this district. Those data for the smaller mills are not available.

Mills.	Average daily cubic feet, board measure.	Average number of days per month operated.	Forest charges Jan. 1-Nov. 30, 1919.	Average stumpage price per 1,000 board feet of tally.
Kolambugan Lumber & Development Co	70,598	13.33	29,852.64	2.876
Mindanao Lumber Co. ...	21,778	14.5	14,652.01	4.21
Mindanao Lumber Co. (Margosatubig)	8,117.35	15.27	3,619.29	2.65
Basilan Lumber Co. ...	15,433	17.90	10,816.89	3.39
Port Banga Lumber Co. ...	13,723	20 27	9,726 47	3 128
Misamis Sawing Lumber Co.	4,033	14.18	2,495.54	3.966
Lu Shio Quan and Lu Eia ...	3,465	12.72	1,590.67	3.21
Port Lebak Lumber Co. ...	12,953	25.22	22,405.21	6.23
Olutanga Lumber Co. ...	14,795.05	17.04	9,896.11	3.56

The maximum yearly capacity of all the mills in Mindanao and Sulu, assuming 300 operating days per year, is given below:

Mills.	Location.	Maximum yearly capacity. *Board feet.*
Kolambugan Lumber & Development Co.	Kolambugan, Lanao	13,000,000
Mindanao Lumber Co.	Naga - Naga, Zamboanga	9,000,000
do.	Margosatubig, Zamboanga	2,000,000
Olutanga Lumber Co.	Olutanga, Zamboanga	5,200,000
Port Banga Lumber Co. ...	Port Banga, Zamboanga	4,600,000
Basilan Lumber Co.	Isabela, Basilan, Zamboanga	6,000,000
do.	Maluso, Basilan, Zamboanga	1,500,000
Dr. J. W. Strong	Basilan Island, Zambaonga	300,000
Sulu Provincial Government .	Jolo, Sulu	300,000
Port Lebak Lumber Co. ...	Port Lebak, Cotabato	4,586,796
Lu Shio Quan and Lu Eia ...	Cotabato, Cotabato...	2,000,000
Misamis Sawing Lumber Co .	Misamis, Misamis ...	1,500,000
Lumarao Mill	Sibuguey, Zamboanga	5,000,000
William Lamb	Zamboanga, Zamboanga	200,000
Mr. Carlsons	Davao, Davao ...	200,000

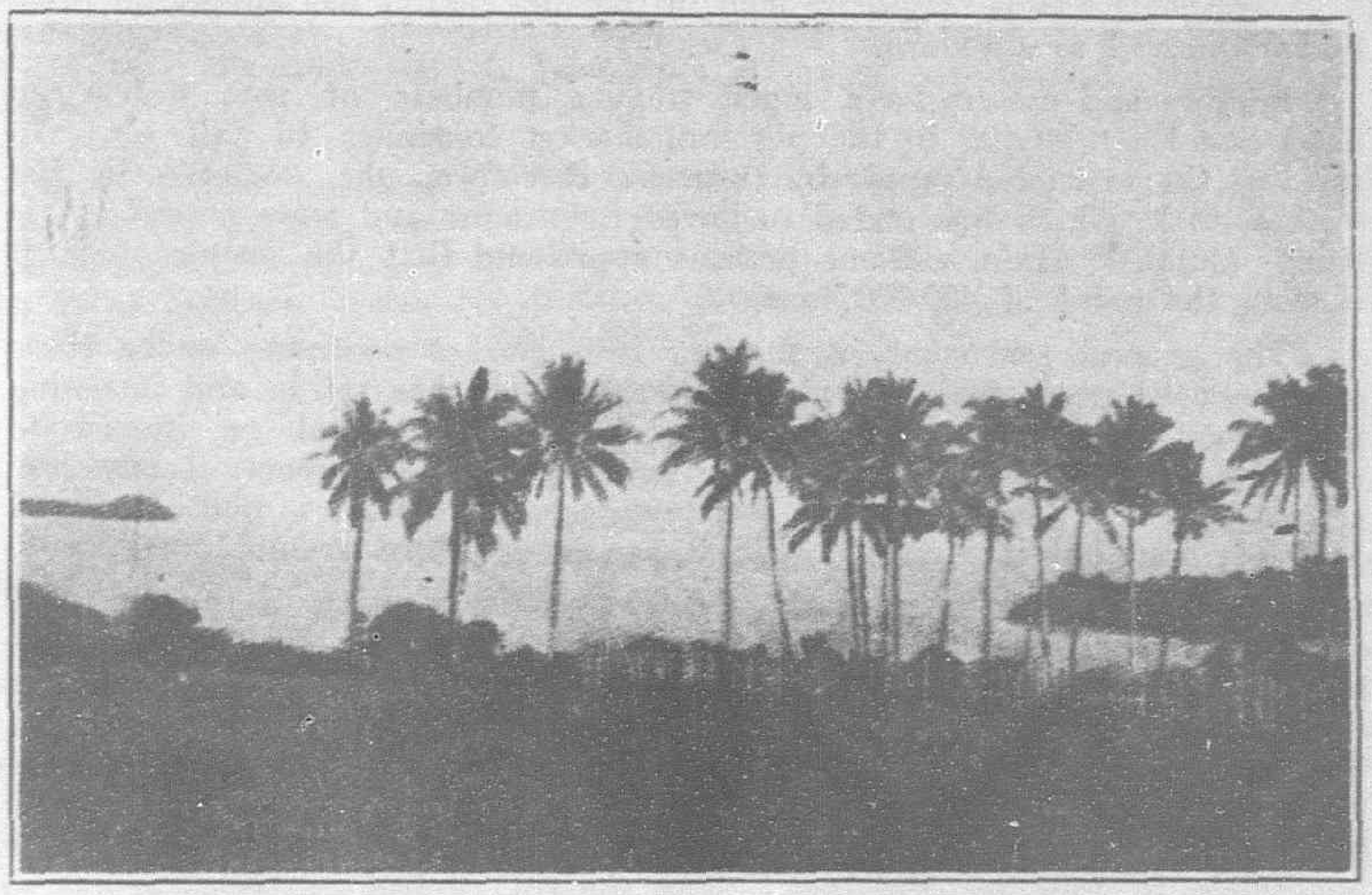
Lumbering.—The provincial government of Sulu has been logging the Jolo teak reserve. Tie makers in the province have continued to be active and as an example of their activity there can be cited the shipment of 25,000 ties in July from one license area alone.

The principal species cut by the mills in this district in the order of their abundance are: Lauans, 42 per cent.; lumbayao, 14 per cent.; apitong, 12 per cent.; yacal and molave, 12 per cent.; pagatpat, 4 per cent.; and miscellaneous, 16 per cent. Manila gets 45 per cent. of this lumber; Cebu, 15 per cent.; Zamboanga, 12 per cent.; other provinces in the department, 19 per cent.; and other provinces, 4 per cent.; and Shanghai, 5 per cent.

Sawmills.—More timber was turned out of the mills last year than in any previous year. There has been a general tendency on the part of the owners to increase the capacity of their mills. The province of Sulu has its own mill, which has been operating at the city of Jolo since last April.

Mineral Products

Of the mineral products of Mindanao-Sulu, the following may be mentioned as the principal ones: Gold, iron, copper, coal, petroleum and platinum. Gold is found in the Agusan Valley between the boundary line of this province and the province of Surigao, also in other regions in Mindanao; while iron lies along the boundary region between the provinces of Surigao and Agusan and the Pacific coast. Petroleum is found in the Pidatan region between Lanao and Cotabato, the oil springs flowing in different places and covering several miles in extent. Coal is found in Agusan and in the Dumanquilas Bay, where at present the National Coal Co. at Malangas is undertaking its exploitation. Copper is found in the coasts and mountains of Tawi-Tawi and in other points in Mindanao, while platinum is found in the northern part of Mindanao, especially in the region behind Dapitan and Dipolog.



Entrance to Parang Bay. Bongo Island in the distance

With the exception of the coal mine, the exploitation of which is being commenced, and of the Cansuran Mining Co. which is operating in Surigao in the region close to Agusan, none of the above-mentioned products are exploited. There is an organized corporation which had registered petroleum mining claims in the Pidatan region and there are about 11,000 hectares registered under gold-mining claims in the Agusan Valley; but none of these mine deposits have yet been exploited. The Manobos of Agusan, however, are obtaining gold from the bed of the Sulibao Rivers; and the Moros are also obtaining copper in the Tawi-Tawi Islands. It would be an excellent thing for the National Development Co. to undertake the exploitation of these mineral products, which undoubtedly will bring about immense benefits.

Manufactures

No manufacture of any importance on commercial basis exists in Mindanao-Sulu. The Zamboanga Oil Co., which should be one of the biggest oil industries in the south, is not in operation, notwithstanding the fact that this company is now provided with its own machines and buildings necessary for operation. In all parts of Mindanao-Sulu there exist small manufactures of furniture, mats, hats, household goods, weaving, ironworks, vehicle-construction shops, and other similar activities, but none, however, has yet acquired any considerable commercial importance. The manufacture of tiles is calling the attention of the people of Zamboanga, and should the price thereof be reduced a little the demand for this industry, the products of which are daily being improved, will increase. The industrial schools are fast progressing in the manufacture of furniture, hats, baskets and other household articles, and these products are gaining greater favor on the part of the public. This educational system not only trains good artisans but at the same time gives encouragement for greater production on the part of private persons who are devoting themselves to these manufactures.

FAR EASTERN IRON AND STEEL

THE IRON AND STEEL SITUATION IN JAPAN.—The pig iron market in Japan is growing still worse and the price is very irregular. It is stated by men in the line that it has almost no price to be followed as standard.

Forgers and casters have much smaller numbers of new orders on hand and their buying in the pig iron market continues to fall off. In spite of the restricted supply by furnaces, therefore, the decrease in the visible stock, which was stated to have grown more and more noticeable, is being stopped again. Some persons apprehend that the visible stock is nearing the point of 400,000 tons.

The general sentiment in the pig iron market continues under these conditions to grow weaker, and now that summer has set in and incoming news, too, fails to give any incentive it is feared that no immediate recovery is possible. The price is very irregular. Buyers, if any, can get cargoes at their bidding. Japanese coke pig No. 1 is quoted around Y.70 per ton, but it is stated that it can be obtained around Y.60.

The opinion obtains, says the *Asahi*, that the revision of the Japanese customs law and the lowering of the rate of interest by some banks have brought a livelier tone to the iron market. But the trade in America continues depressed. Steel companies there have decisively decreased wages, while there is an expectation of the price further declining in the future. To make the situation still more grave, arrivals of Belgian imports and Germany's scheme to export to overseas countries render it impossible to hope for the best. The present revival is, therefore, it is observed, merely a temporary phenomenon. Respecting sales by the Yawata Ironworks during last month they have increased somewhat in volume, but new orders are almost paralysed, as usual. Mr. Shirani, the president of the government ironworks, is at one with the Osaka journal concerning the opinion on the causes for the recent activity, and he is of opinion that the price of steel will decline to the extent of Y100 per ton. Accordingly, there will be some complicated circumstances to cope with, but the chief point is the need of economising producing costs. The government ironworks intend to effect a second decrease to the same extent as American and Belgian goods. Last year, the ironworks were in a very difficult position, in connection with the protection of iron merchants, but this year will proceed on a policy resolutely to decrease their prices in conformity with the fluctuations of American goods in disregard of the position of the merchants, and also, it might be added, in disregard of their own losses.

* * *

YAMANOUCHI & CO. of 188 Minami Sakaigawa-cho, Nishi-ku, Osaka, of which Mr. S. Yamanouchi is manager was organized recently to do business in iron and steel.

* * *

THE KATSUMA IRON WORKS was organized recently to manufacture machines and tools. Office: 192 Minami Nagai, Toyosaki-cho, Nishimari, Osaka. Manager: Mr. T. Imanaka.

* * *

POOTUNG TO ESTABLISH A STEEL WORKS.—A certain Chinese merchant named Loh has proposed to establish a steel works at the Pootung Bund to produce steel supplies which are in great demand in the Shanghai market. Subscriptions to the capital fund are being called, and it is expected that the company with operate in the near future.

* * *

JAPAN PURCHASING SWEDISH PIG.—Within the past few months the Japanese navy department has purchased 20,000 tons of Swedish pig and, it is understood, it in the market for an additional 5,000 tons of this material. It is also reported that the department has asked for bids for a hydraulic press of 16,000 tons capacity.

The following five trade notes were submitted by Consul H. F. Hawley, as translated from the Japanese press:

* * *

THE ZATSUGA IRON WORKS was organized recently to manufacture machines for ships repairs. Office: 597 Sanchome, Kujominami, Nishi-ku, Osaka. Manager: Mr. T. Sano.

* * *

THE OSAKA TUBE MANUFACTURING CO. was organized recently to manufacture patent tubes. Office: 956 Mato ise-cho, Osaka. Manager: Shinjiro Torli.

THE FUKUMOTO IRON WORKS was organized recently to manufacture metals for ship-building. Office: 9 Itchome, Kita, Ajikawa-dori, Kita-ku, Osaka. Manager: Mr. T. Kataoka.

* * *

MEANS FOR MAINTAINING THE PRICE OF PIG IRON.—The price of pig iron is extraordinarily low; below the cost of production. Moreover, there is a great accumulation of stock being estimated at 400,000 tons, including 300,000 tons in Osaka, Kobe, Tokyo, and Yokohama and 100,000 tons in Korea and Manchuria. To maintain the market prices, a loan has recently been raised from the central bank, but the Japanese manufacturers consider it necessary to establish a union selling office and to sell their produce at a uniform price.—*Tokyo Asahi.*

COST OF IRON AND STEEL PRODUCTION IN CHINA.—Writing in the *Peking Daily News,* D. K. Lieu (former cost accountant of Hanyang Iron and Steel Works) says, iron and steel have been for centuries manufactured in this country, but not until recently, were they manufactured according to modern processes. The old method of manufacturing which is still employed in small scale production is simple and crude, and involves very low costs, chief of which are raw materials and direct labor. There is no way of finding out the exact cost in such cases owing to the variety in the composition and quality of the product. Hence our study will be confined to the manufacturing cost in the modern iron and steel works.

Of the modern works the greatest is undoubtedly that at Hanyang, owned by the Hanyehping Company, which was made particularly well known by an exchange of notes between China and Japan in connection with the infamous twenty-one demands of 1915. In serving as cost accountant of the Hanyang Iron and Steel Works in 1919 and 1920, the writer obtained first-hand information of the detailed items of cost as well as certain illustrative cost data which will be given in the following account. Costs at other works and in other countries will also be given in different connections for the sake of comparison.

COST OF PIG IRON.—We shall start with the manufacturing cost of pig iron. This, as the iron is produced at Hanyang by the blast furnace department, is made up of five items, each of which is minutely subdivided. The five items are:—

(1) raw materials; (2) direct wages; (3) manufacturing expenses; (4) general expenses; and (5) financial expenses. Under the first heading are grouped all kinds of raw materials—iron ore, manganese ore, limestone, coke, and many other varieties of iron sometimes used in place of iron ore, such as scrap iron, native white iron, reheating furnace slag and mill scale. The first four kinds of materials form the chief constituents of pig iron, because, in addition to iron and manganese, pig iron contains silica, which is obtained from limestone, and carbon, which is obtained from coke. It also contains a certain percentage of sulphur and phosphorus, both of which come from the ore itself.

The most expensive single item among raw materials, which is also the most expensive of all items of cost, is coke. For the first seven months of 1919, the figures varied from 45.7 to 55.4 per cent. of the total cost of pig iron. And yet the coke is of the best grade, only about 120 tons of it being necessary for the production of 100 tons of pig iron. The coke is produced at the company's own colliery at Pinghsiang; from coal of such a quality that it takes only about one ton of coal to produce one ton of coke. Under such exceptionally favorable conditions, it needs some explanation to justify the value per ton of coke at $20, and that of pig iron at $47 to $53. This explanation will be given in the course of this article.

THE IRON ORE.—The next largest item of cost in raw materials involved in the supply of iron from iron ore or from other substances. Of these, mill scale, furnace slag and scrap iron need hardly be considered, as they are only used to a very limited extent; and would be sold at a loss on the market if not consumed in the blast furnace or the melting shop. The native white iron used in the Hanyang works is very costly, ranging from 2 to 13.5 per cent. However, as the use of this kind of raw material is unnecessary, and as it has been used simply because the works has it in stone—being bought years ago at farcical prices—it should not be seriously considered as an important item of cost.

(To be concluded)

Engineering, Financial, Industrial and Commercial News

AUTOS

New Automobile Enterprise.—A rich Chinese merchant is said to have organized a company for running motor cars between Hengtan railway station and Hwangpei city. The company has a capital of $100,000, and the first outlay is to be made in the construction of good roads. The Hwangpei Commercial Bank in Hankow is to be the temporary office of the company.

Shanghai-Nanwei Automobile Transportation Co., capitalized at $200,000, is being organized at Shanghai to operate an automobile service on the newly built Shanghai-Nanwei road.

AVIATION

Flight from Kiushiu to Shanghai.—In connection with the proposed aerial flight to be executed in October between Kiushiu and Shanghai, the distance being 600 miles, for which the Imperial Aero-Society offers Y.50,000 as a prize, Colonel Tokunaga of the Society is now making arrangements in Shanghai regarding the landing ground, etc. Those civilian aviators who intend to participate in the flight have already commenced their preparations.

Mitsubishi Factory at Nagoya.—Y.5,000,000 will be spent by the Mitsubishi Company on the building of an aeroplane factory at Nagoya city. Aeroplanes of a French type will be built and British aviators will superintend trial flights.

Sino-American Aerial Transportation Company. –A certain Chinese merchant is planning with some American aviators the establishment of a Sino-American Aerial Transportation Company with a capital of G.$100,000 to be divided into 1,000 shares at G.$100 each. The proposed company will be organized under American law and will be operated under Sino-American joint management. The first airline it will run will probably be between Shanghai and Woosung.

Airship for Japan.—The first airship built for the Japanese government was launched by Vickers last May from their airship shed at Barrow. She is of the sea-scout class, carrying one gondola and a small crew. The ship made a satisfactory trial flight, carrying several Japanese officers. With a speed of 55 miles per hour, the craft is 175-ft. long, and carries a crew of five. Being non-rigid, it can be deflated and transported anywhere.

BRIDGES

Bridge Across Sumida River.—A great iron bridge, to be the biggest in the Orient, is to be built across the Sumida River, connecting the Ryogoku railway station with the Manseibashi elevated railway station.

The work on the bridge will be started in the fiscal year of 1925-6 or 1926-7. The work on the elevated electric line between the Kanda station and the Uyeno station is expected to be completed about 1923. It will have a height of about 20-ft. with walls built on both sides.

The bridge which will start from Manseibashi will turn toward the left and run over the Kanda River forming a canopy for the river to the Sumida River near the present Ryogoku bridge and across the river to the Hojo side of it. The elevation will be 40-ft. as it will run over the Kanda-Uyeno line, 20-ft. high.

A New Bridge. Java.—The Augsburg Nurnberg machine factory which is the largest German concern there have received an order to construct a bridge across the Tjitarum river between Weltevreden and Tjikampek on behalf of the state railways.

BUILDINGS

New Municipal Buildings, Tientsin.—At an extraordinary general meeting of the ratepayers of Tientsin approval was given of a building scheme for the provision of new municipal offices in the British concession at an estimated cost of Ts. 250,000. A bye-law was also passed providing for the slaughter of cattle in approved slaughter houses and inspection by a veterinarian licensed by the council.

The Kanagawa Prefectural Office will build a new middle school in Yokohama on a site of 8,500 *tsubo*.

Large Acreage Purchased by Tokyo City.—23,000 *tsubo* have been purchased by Toyko city next to the Aoyama public tomb, Tokyo, on which to build 270 houses.

New Government Buildings: Japan.—The home, finance, education, military, agriculture and commerce departments of the Japanese governments are to be housed in new buildings the cost of which will be Y.6,000,000. They will be built near Sakurada gate.

The Kobe Imperial Government Railway Department has a plan which involves the construction of a large car shed at Tenne-ji, Osaka city.

COMMERCIAL

Hirai Bros. & Co. was organized recently to import metals. Office: 18 Odenma Shio-cho, Nihonbashi-ku, Tokyo. Manager: Mr. I Hirai.

Demand for Gunny Bags.—There is a large demand in Manchuria for gunny bags. A Japanese company recently established a gunny bag factory in Mukden. Its present output is 1,200 bags daily, but it is expected that this will be greatly increased. The bags are 43 by 29 inches and of two weights, 2 and 2½ pounds. The former have been selling at 32 gold yen per 100 and the latter at 36 gold yen.

A Raw Silk Bureau.—Certain Chinese and American silk merchants have proposed to establish a raw silk investigation bureau in Shanghai, with a capital of $500,000

The Fukuda Trading Co., Lfd., 91 Nichome. Kitahama, Higashi-ku, Osaka. Manager: Mr. T. Maruyama. Established recently with a capital of Y.1,000,000 to do a general commission agent business.

Watanabe & Co. 12 Nishi-ku, Osaka. Manager: Mr. K. Watanabe, have organized to conduct a business in iron and steel machinery and tools.

Hardware Merchants.—Yoshimura Shoten & Co., 1,026 Nishi Yente-cho, Namba, Osaka. Manager: I, Yashimura. Recently established.

The Shinano Shoten Co., Ltd. wos organized recently with a capital of Y.50,000 to sell construction material. Office: 126 Shimono Machi, Nishikujo, Nishi-ku, Osaka. Manager: Mr. D. Matsuoka.

Wheat and Flour.—According to the late t report, the daily consumption of wheat for the manufacture of flour in the Shanghai market amounts to 15,500 bushels. The report also says that the total quantity of flour exported from Shanghai during June stood at 267,460 bags equivalent to 200,595 piculs.

The New China Co.—This company was organized in San Francisco recently by progressive, educated Chinese who have been in America for several years. M. C. Foo, president and treasurer, is a graduate (B.A.) of the University of California; Joseph Keh, vice-president and general manager, and Sherman Soo, general secretary and assistant treasurer, are students at the university.

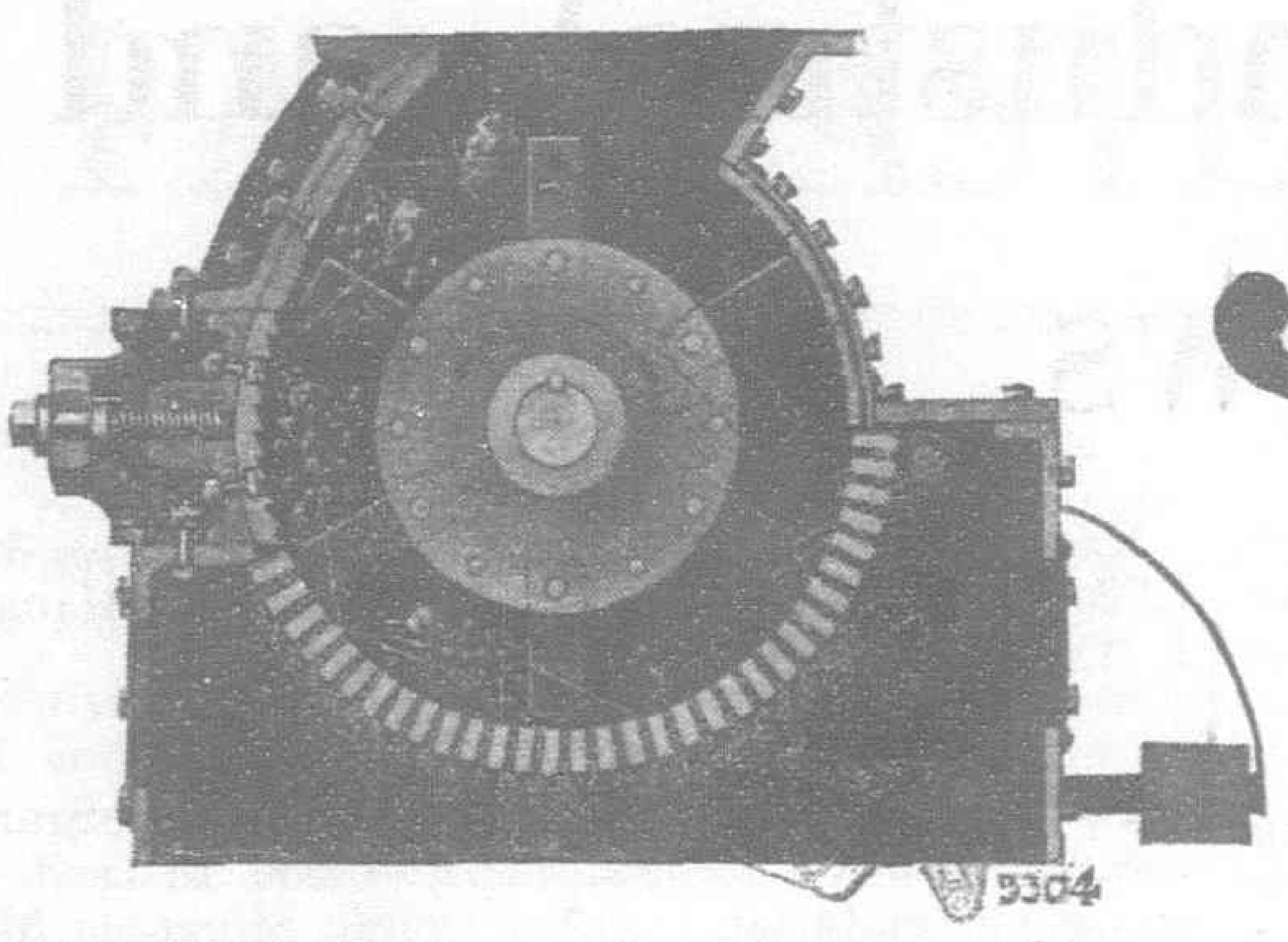
The New China Company has a branch office at Shanghai and established agencies at Hongkong, Canton, Fengtien, Swatow, Penang, S.S., and Chicago. It will conduct a general importing and exporting business, specializing on the importation of metals, ores, oils, peanuts, silks, beans, rubber, etc., and the exportation of American manufactures, more especially machinery.

Late Reports of Registration of New Corporations.—According to reports, the following new corporations have been lately registered with the ministry of agriculture and commerce :—

Shou-shing Telephone Co., Shou-shing, Chekiang.
Jui-An Electric Light Plant, Sui-an, Chekiang.
Hua-Sun Weaving & Dyeing Co., Chihli.
Kiu-Dah Hosiery Manufacturing Co., Shanghai.
Hua-Dah & Co., Kiangsi.

Registration of New Corporations.—According to reports the following corporations have been lately registered with the ministry of agriculture and commerce :—

Chowshan Electric Co., Chowshan, Chekiang.
Kirin Electric Co., Kirin.
Lung-chia-shan Tin Mining Co., Lung-chia-shan, Anhwei.
Hsuan-chen Coal Mining Co., Hsuan-chen, Anhwei.
Da-hwong-shan Magnet Mining Co., Da-hwang-shan, Kiangsi.
Da-kung-shan Mining Co., Da-kung-shan, Chekiang.
Yao-yang Matches Factory, Yangchow, Kiangsu.
Ziang Sin Flour Mill, Shanghai.
Kwang Ming Dyeing and Weaving Factory, Chekiang.
Hun Shing Dyeing and Weaving Factory, Kiangsu.
Tung Shun Salt Fields Reclamation Co., Kiangsu.
Nantungchow Cotton Exchange, Nantungchow.



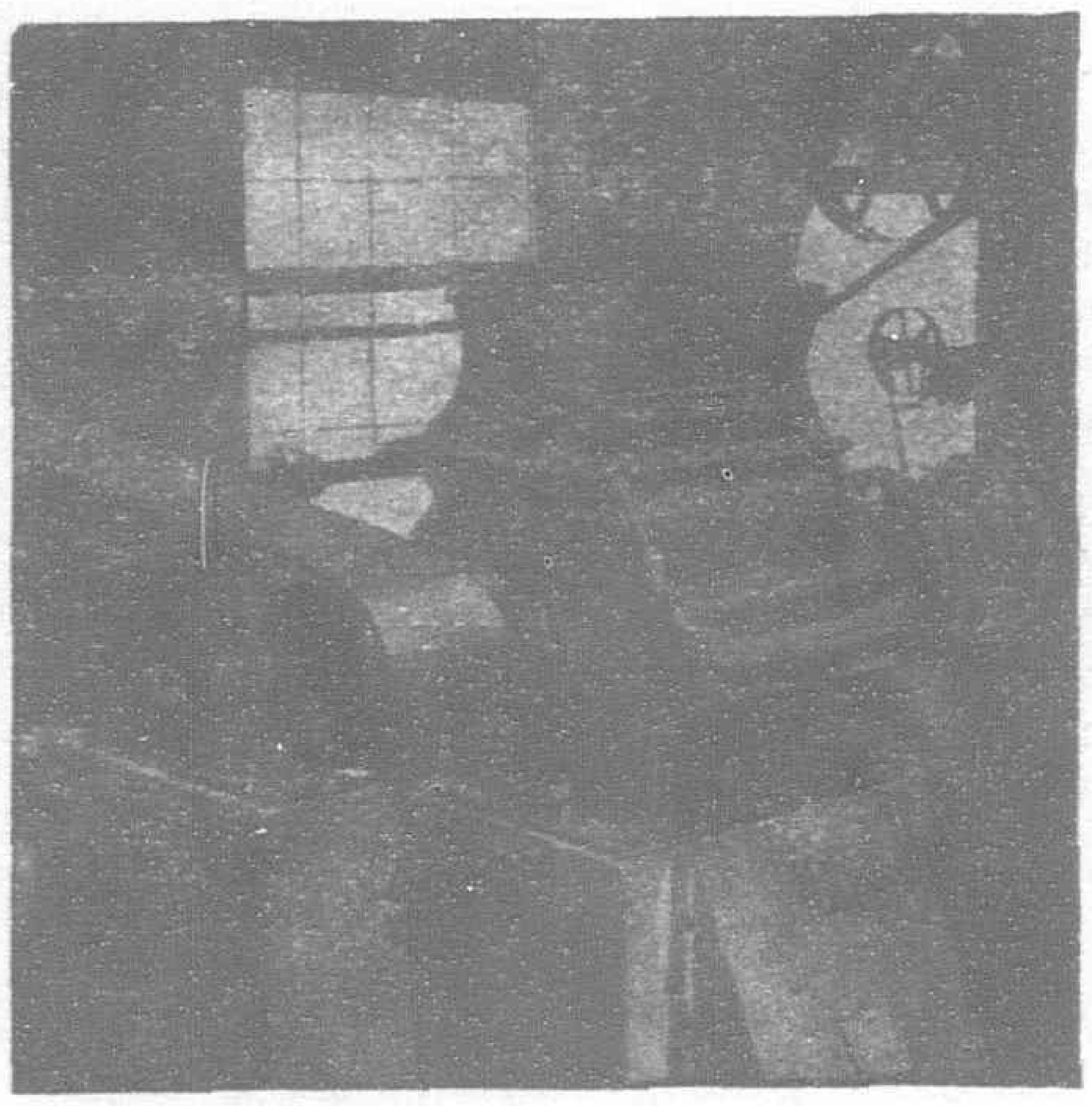
Type "B" Pulverizer—a fine grinding machine for hard service.

JEFFREY SWING HAMMER PULVERIZERS

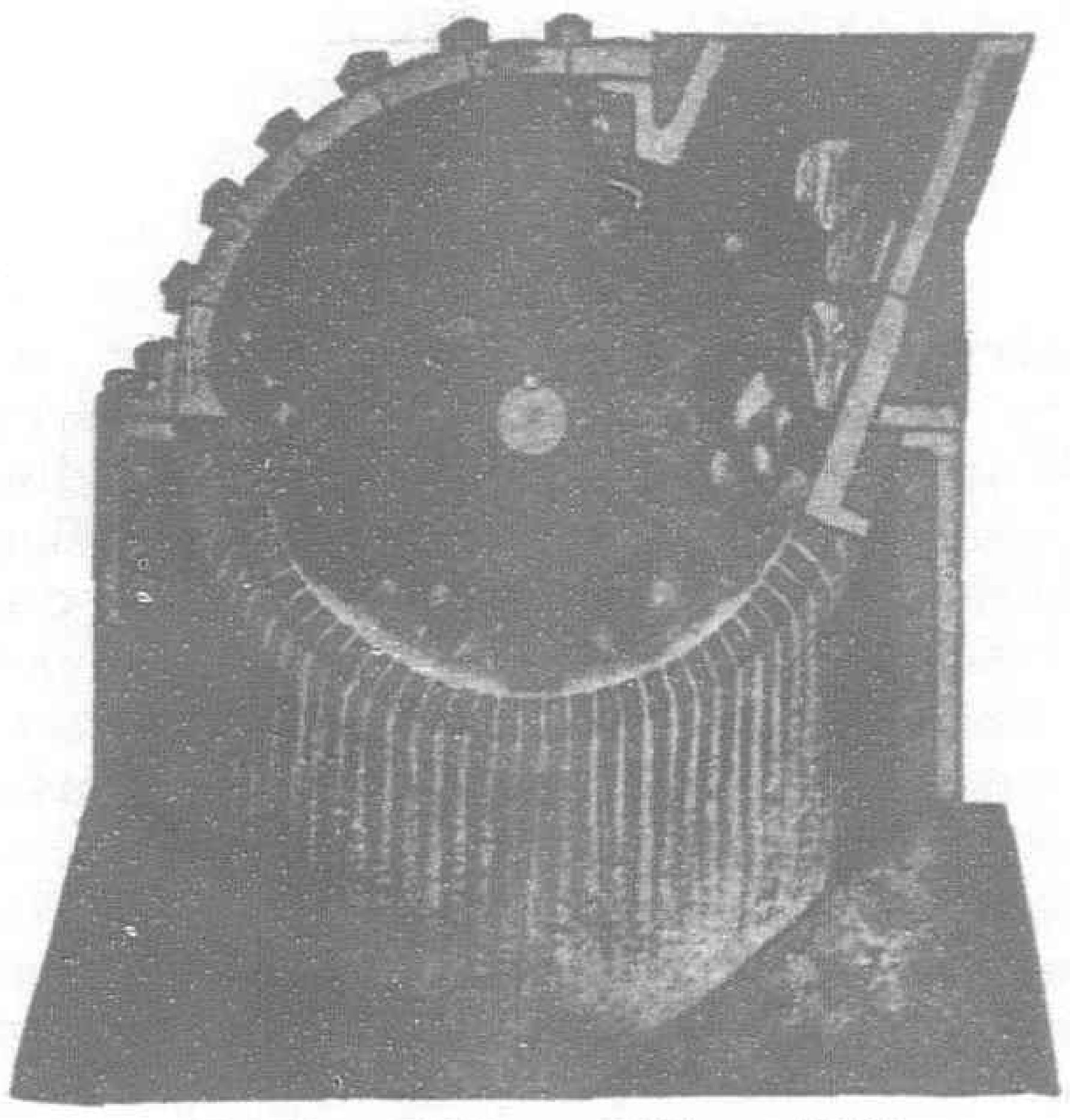
Grind all kinds of Friable Materials to the Proper Degree of Fineness with Minimum Power Consumption.

Built in various types and sizes with wide range of capacities and products.

Let our expert Engineers cooperate with you and submit recommendations and quotations on our standard equipments, to suit your individual requirements.



Type "B" Pulverizer grinding Limestone in a cement plant.

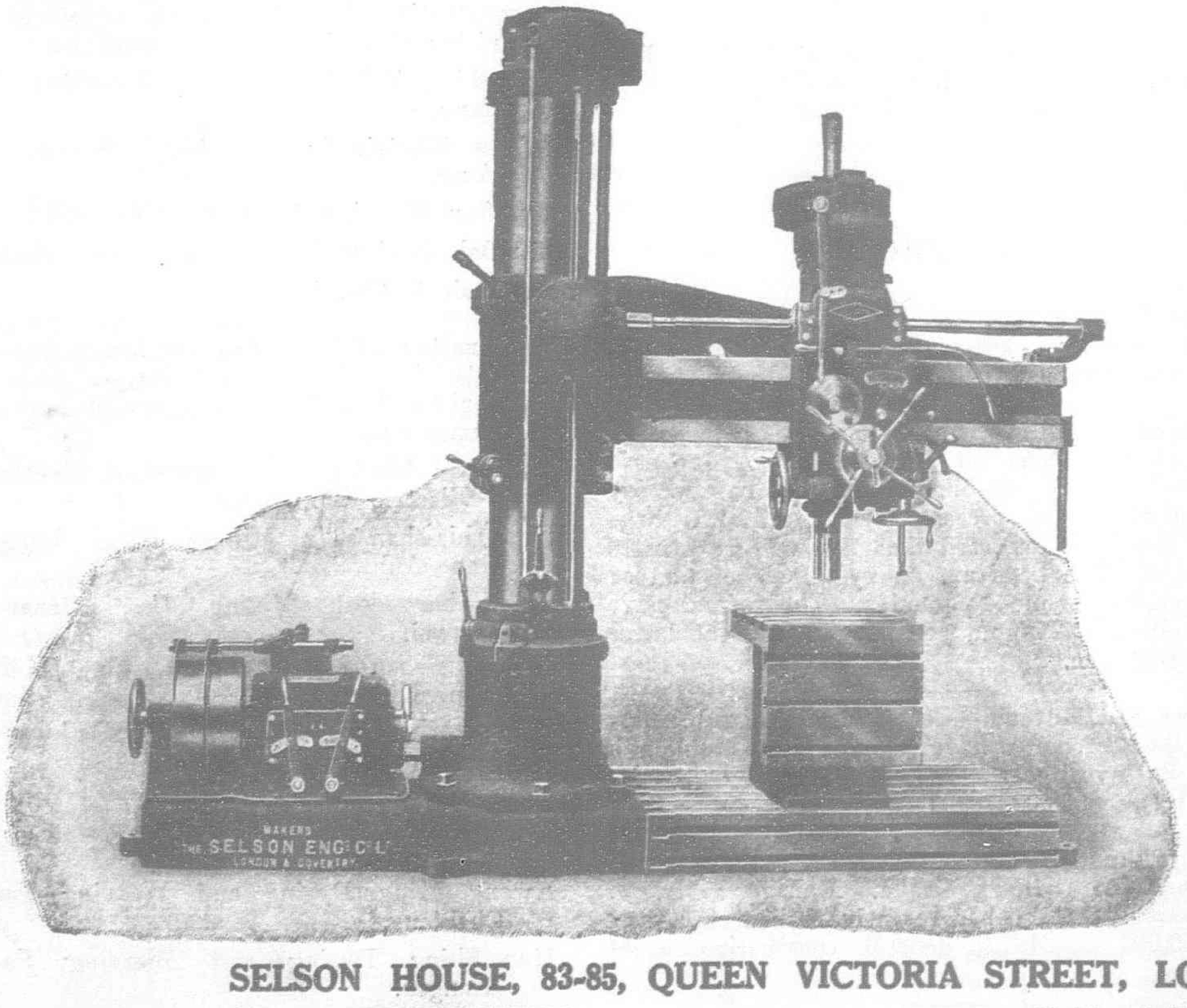


Sectional View of Type "A" Pulverizer.

The Jeffrey Mfg. Co.

Columbus, Ohio, U. S. A.

The SELSON Central-Thrust Radial Drilling Machine



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Works: COVENTRY Cable Address: SELSONEER, London
Makers of Lathes, Shaping Machines and Engineers' Machine Tools generally. Also Small Tools.

Nantungchow Cotton and Yarn Exchange, Nantungchow.

Sun Fong Electric Co., Kiangsu.

Chin Foong Spinning & Weaving Co., Kiangsu.

DEVELOPMENT

Mongolian Development Company.—Chang Tso-lin proposes to organize an industrial corporation to develop Jehol, Charhar, and Suiyuan, with Chang Hsung, the monarchist, as its director.

Japanese Cities Embracing Suburbs.—Details of the proposed schemes for an extension of Osaka and Kobe cities have been submitted to the governors concerned by the home minister. Osaka will incorporate Sakai city and 70 other adjacent towns and villages.

A Railway and a Silver Mine.—The construction of a railway from Hueining, on the border of Korea and Manchuria, to Tienpaoshan in Kirin has been under discussion for two months or more without attracting any particular attention. Negotiations were brought to an abrupt end four days ago when the representative of the Kirin promotors died rather suddenly in the west city.

According to report there is a Chinese silver mine at Tienpaoshan, which has never paid particularly well but in which Japanese engineers have considerable faith. Some years ago the Chinese owners borrowed money from the Japanese to instal improvements but never met with sufficient success to enable them to pay off the debt. The Japanese now propose to operate the mine and make it pay and to this end prompted the Chinese interested to apply for a railway concession. The suggested line would presumably be a branch of the Kirin-Hueining railway and would be constructed on somewhat the same terms. It is said that the deal was nearly consummated when the authorized agent disappointed all parties by dying.

Harbor and Railway Improvements at Tjilatjap, Dutch East-Indies.—It is stated in a recent issue of *Eastern Engineering* that tenders are being invited for cranes, piers, godowns and other construction for the modernization and extension of the harbor works at Tjilatjap, on the south coast of Java, while railway stations and yards at Bandong, Batavia, and Soerabaya are to be reconstructed at the cost of several million florins. The naval dockyard at Soerabaya is also to be extended and new docks, wharves and piers, in addition to other works, are planned. The Netherlands East Indies government intends to spend approximately 5,500,000 florins on the Soerabaya dockyard during 1921. The municipality of Bandong is considering the establishment of a motor omnibus service in the environs of that town, while a new railway terminus station is to be constructed and shared jointly by the Netherlands Indies Railway Co. and the Netherlands Indies State Railways.

ELECTRICITY

New Electrical Combine, Japan.—The Sanyo Hydro Electric Company, capitalized at Y.7,750,000, and the Yehine Hydro Electric Company, capitalized at Y.3,000,000, have amalgamated with an increased capital making in all Y.12,550,000. Mr. T. Hiraga is the president.

New Combine, Japan.—The Kinugawa Hydro Electric Company and the Kinugawa Industrial Company have amalgamated.

The Imperial Electric Light Co., Ltd. was organized recently with a capital of Y.18,725,800, one half paid up, for general electric enterprises. Office : 9 Midami Kiuroku-cho, Kyobashi-ku, Tokyo. Managing Director : Mr. B. Iunmoto.

The Yamoto Electrical Machinery Co., Ltd. was organized recently to manufacture electrical machines and tools. Office : 3430 Nishi Sugamo, Tokyo-fu. Manager : Mr. H. Fujita.

The Ichigo Electric Power Company, Ltd. was organized recently with a capital of Y.1,000,000, quarter paid up. Office : 1 Itchome, Yayesu-cho, Kajimachi, Tokyo. Manager : Mr. H. Nakajima.

Electric Light Plants, Nantungchow.—A new electric light plant named King-sing with a capital of $25,000 has been established at King-sha-tze, near Nantungchow. Another electric plant known as Kai-yuen with a capital of $50,000 has been formed at Zai-tze, north of Nantungchow. Both plants commenced operations on the same day, June 22, 1921.

The Naniwa Electric Industrial Co. was organized recently to manufacture electric machines and tools. Office : 22 Kitamori-cho, Kita-ku, Osaka. Manager : Mr. F. Fujii.

New Hydro-electric Power Plant for Philippines.—What promises to be the most extensive private venture of the kind in the Philippines is now well under way in the form of a hydro-electric project designed to furnish lighting and electric power to the provinces of Bataan and Pampamga, comprising a population of approximately 48,000, states the Bulletin of the Philippine government commercial agency. The Abo-Abo and Tiawir Rivers, believed to be able to yield a capacity of some 200 horsepower each, will be utilized for the project. Field explorations of the district from which the company will develop electric power has revealed the existence of large deposits of magnetic iron ore. The iron is known to stand a high degree of temperature and is very suitable for internal-combustion engines. Its electric treatment has proven quite successful and the company expects to be able to exploit it to a maximum degree.—*Commerce Reports.*

The Asahi Electric Industrial Co. was organized recently to do a general electrical business and to manufacture hydro dynamo wheels. Office : 1 Marikawa-cho, Hongo-ku, Tokyo. Manager : Mr. K. Tanaka.

A New Power House Planned.—The Toshin Electric Company which amalgamated some time ago with the Meiji Electric Company plans to construct a new power house (10,000 kilowatts) from which power will be supplied to the cities of Tokyo and Yokohama.

New Electric Tramway, Japan.—The Nankai Railway Company has been granted a permit by the department of railways for the extension of its electric service between Hiranogo and Kashiwabara, towns in the suburbs of Osaka.

Tokyo's Electric Light Co.—In commemoration of the 35th anniversary of the establishment of the company, the shareholders of the Tokyo Electric Light Company have voted a million yen to the municipality for public welfare. The donation is to be used for the development of electric enterprises in the city.

Branch Electric Light Plant, Nanking.—It is reported that the branch electric light plant of Nanking will operate on July 1st.

New Electrical Machinery, Wuhu.—The Ming-Yuan Electrical Plant has issued a notice stating that until the installation of new machinery is completed, the installation of lamps to the public will be temporarily suspended.

Chinese Electric Plant, Peking, has recently purchased new equipment to be installed in their newly built station at Shihchinshan, west of Peking.

Electrical Developments, N.E.I.—There are indications of a great development in the generation and use of electricity throughout the Dutch East Indies. Extensive investigations are being made into the water power of the various rivers with a view to the electrification of the railway and tramway systems, Housing and building schemes in all the large towns and seaports in Java and Sumatra call for supplies of electrical apparatus of various types.

Hydro-Electric Plant, Sunning.—Chen Yi-hee. the founder of the Sunning Railway, expects to organize a company with a $2,000,000 capital to be mostly subscribed from natives of the Sunning district in America, to supply electricity for Sunning generated by power from a nearby water-fall. As soon as the proposed capital has been fully subscribed, the necessary machinery required will be ordered.

Water-Power Development, Netherlands Indies.—New projects for the development of water-power in the Netherlands East Indies continue to be launched. Work on a power-station in the Residency of Batavia was commenced last year, and when finished more than 50,000 horse-power will be generated. The current from this station is designed to electrify the Batavia railway and to supply light and power to the towns which the railway serves, among which Tandjong, Priok, Batavia, Meester Cornelis, Buitenzorg, and Soekaboemi. In the Preanger Regencies a plant is under construction having an initial capacity of 3,300 horse-power, and as soon as this is running an additional water reservoir is to be constructed so that the power may be doubled. On a tributory of the Tjisadana, to the west of Buitenzorg, still another station is to be erected, and the machinery at this third point of generation is calculated to turn out between 25,000 and 28,000 horse-power units. The preliminary plans for this work have already been completed, and as soon as the machinery can be obtained actual constructive work will commence. *

FORESTRY

Harbin Forestry.—An extensive district situated north of Yi-me-pu, Harbin, covering 170 *li* in length and 20 *li* in width, has been found to be suitable for the growth of willow trees. A capital of $1,000,000 is required to develop the project.

GENERAL

Fishery Company Established at Tsinan.—According to Tsinan Chinese papers, certain local gentry named Tung Yu-mei, Lü Ching-san, An Mou-keng, etc., have established a fishery company named Hua-Tung Yu-I Kungssu, capitalized at $7,500,000, for the purpose of fishing in the Yellow Sea and the Gulf of Pechihli by using 60 trawls and deep-sea fishing boats. Besides, the company will establish a fishery bank to accommodate fishing folk, and a canning factory.

INDUSTRIAL

Brick Factory at Medan, N. E. I.—During its first financial year extending over thirteen months the clay-industry at Medan paid a dividend of 11 per cent., while for the second year it will probably be 6 per cent., something like 8 per cent. having been written off. The Company are building an up-to-date circular kiln, capable of turning out 1,200,000 bricks per month, calculated to cost about glds. 150,000.

New Cotton Mill, Canton.—A message from Canton states that a new cotton mill, capitalized at $2,000,000, is about to be built in one of the outlying districts of Canton.

New Sugar Mill, Java.—The new sugar-mill, Sendang-pitu, situated in the north of the Diocja province, will be finished in 1922.

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* Continued on page 576

HIGH POWER

Radio Apparatus

For Long Distance Communication

We are one of the few companies in the world who can supply high power radio equipment.

The Fuller Arc type of continuous wave generators are by far the most satisfactory and economical transmitters in use to-day, where great distances must be reliably carried.

The great chain of arc radio transmitters of the American Navy Department, the great French station at Bordeaux, France highest powered station in the world, and many others are of this type.

Of course we also manufacture medium and low power equipment.

Any transmitting radius from 1 Kilometer to 20,000 Kilometers. From 1 mile to 12,000 miles.

Receivers, detectors and amplifiers for any wave length range, continuous or damped.

Contractors to the United States War and Navy Departments.

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Additional Foreign Connections Desired.

Whangpoo Conservancy Board

NOTIFICATION No. 108

Tenders are hereby invited for the following steel vessels:–

"A" One Steel Pontoon for "EE" type Priestman Grab dredging machine.

"B" One Single Screw Steel Tow Boat about 80-90-ft. long and developing about 250 horse-power.

"C" Two "Universal" Steel Non-propelling Mud Barges each having a hopper capacity of 385 cubic yards.

Specifications for each of the above items can be obtained at the Board's Office (Dredging Department), 6 Kiukiang Road. Each item should be tendered for separately; and the order for "A," "B" and "C" will be placed independently of each other.

Sealed tenders for any or all of the vessels addressed to the Whangpoo Conservancy Board, Shanghai, and marked Tenders Notification No. 108 must be delivered at the Board's office before noon on the 31st August, 1921.

The Board do not bind themselves to accept the lowest or any tender.

Shanghai, August 1st, 1921.

(Signed) H. von HEIDENSTAM,
Engineer-in-Chief.

The Japan Wire Company, Ltd. was organized recently with a capital of Y.60,000, quarter paid up, to manufacture copper, iron and steel wires. Office: 5 Roku-chome, Nishira-dori, Tsukishima, Kyobashiku, Tokyo. Manager: Mr. S. Takabashi.

Kirin Paper Mill.—With reference to the proposed establishment of a joint Sino-Japanese paper mill at Kirin, as negotiated for between ex-Military Commander Pao and Messrs. Okura & Co. (a powerful Japanese firm with Baron Okura at the head), the necessary permission was formally granted by the ministry of agriculture and commerce on the 26th last.

A Towel and Handkerchief Co. Organized.—A Towel and Handkerchief Manufacturing Co. known as Sui Tai has been established by Mr. Pai Sui-kar with capital of $10,000 at Yangtszepoo, Shanghai.

New Cotton Mill, Shanghai.—Mr. Kiang Chong-fu and others have recently organized a cotton mill known as Hua-yue at Teh-yue-lee, Nanking Road, Shanghai, with a capital of Tls. 400,000.

New Companies in Shanghai.—Nanyang Trading Co., and Kiangsi Lee-foong Flour Co., established in Shanghai, have been registered with the ministry of agriculture and commerce, Peking.

A New Umbrella Factory, Shanghai.—Mr. Kiang Sung and several others have recently established an umbrella factory outside of the West Gate, Shanghai. It is to manufacture umbrellas of paper, cloth and silk in all styles.

Cloth Factories, Kashing.—In Kashing, Chekiang, two cloth factories, Ka-wu and Cha-yi, with 590 looms, are extending their plant. The Ka-wu factory is having a new building constructed, while the Cha-yi factory is just considering the plan of extension.

Machines for Pig Iron Manufacture will be made by the Koike Manufacturing Company of 432 Minami Senju, Tokyo-fu. Manager: Mr. K. Koike.

The Kyushu Paper Manufacturing Co., Ltd., was organized recently with a capital of Y. 1,100,000, fully paid up, to manufacture paper. Office, 33 Nichome, Antoji-bashi, Minami-ku, Osaka. Manager: Mr. Y. Tanino.

Ice Making and Sugar and Oil Mill Machinery, N. E. I.—In its monthly Review, the British chamber of commerce for the Netherlands East Indies draws attention to the demand for ice-making machinery, ice safes, and storage chests for foods which is ever-present, and just now is exceedingly clamant. Portable ice-making machines and small "freezers" find a ready sale in almost every town in the islands, and United States makers are making a determined effort to capture this section of the market. Mineral waters, made locally, are largely consumed, and machinery for making aerated waters which can be operated either by hand or small power motors are wanted badly. There is also an increasing demand for sugar machinery.

Modern Dying Factory, Shanghai.—A modern dying factory equipped with machinery under the style of Tah Fong with a capital of Tls. 500,000 has been formed at Tso-kar-doo, Shanghai. Machinery ordered from England has been completely installed and some British expert dyers are employed. It is the first of its kind over established by Chinese, and there are good prospects of future development in the business.

New Metal Works, Hangchow.—The Chekiang government will establish a model metal works at Hangchow, with a capital of $200,000 to be subscribed in equal shares by provincial officials and merchants. This new works are to be divided into four departments, casting, handcrafts, electro-plating and enamel wares.

Electrical Spinning Machine Invented by a Chinese.—Mr. Kuo Hsin-geo of Hankow, an electrical and spinning expert, has invented an electrical spinning machine. A factory to build the machines is to established at Ting-Geo, Hankow. Capital is being subscribed by local merchants. A sum of $400,000 has already been raised.

Canned-Goods Manufacturer.—The Heinan Provision Co., Ltd. was organized recently, capital Y.1,000,000, quarter paid up, to can a general line of foods, in Hokaido. Office: 24 Itchome, Okaji-machi, Shitayaka, Tokyo. Manager: Mr. K. Kujirai.

The Kokusai Medicine Manufacturing Co.—This concern was organized recently with a capital of Y.10,000,000, quarter paid up. Office: 22 Sanchome, Minami demma-cho, Kyobashi-ku, Tokyo, Managing-Director: Mr. H. Hoshi.

A Rubber Goods Manufacturer.—The Sum Ichi Company, Ltd. was organized recently with a capital of Y.500,000, quarter paid up. Office: 1 Sanchome, Minami demma-cho, Kyobashi-ku, Tokyo. Manager: Mr. H. Obe.

An Aerated Water Factory.—Twelve villages in Tokyo prefecture have combined to build an aerated water factory at a cost of Y.13,909,900. Without government subsidy the plan cannot nature.

The Meiji Iron Works was organized recently to manufacture machines and boilers. Office: 10 Wakamiya-cho, Honjo-ku, Tokyo. Manager: Mr. I. Iwase.

Artesian Wells for Tientsin.—The ministry of war has purchased twenty drills for sinking wells at Tientsin at the request of the supply service of the Mukden command. The drills are needed for the Mongolian expedition, as in the desert the troops will have to rely on a water-supply from wells of their own digging.

New Cotton Mill, Tsingtao.—The Fuji Cotton Spinning Company is reported to have decided to establish a branch factory at Tsingtao on the site of 100,000 *tsubo* at the estimated cost of Y.3,000,000. Thirty thousand spindles to be fitted up in the new factory have already arrived from England.

Silk Hose Factories Needed.—Chinese-made ladies' silk hose which were selling for $24 per dozen, are now selling for $34 a dozen, as a result of the active buying among foreign buyers for firms abroad. The difficulty experienced by the foreign buyers in the purchase of these silk hosieries, explains the *Canton Times*, is that there are no large factories in China that can turn out enough goods to meet the demand in foreign countries and great inconvenience is encountered in going to the various small factories. It is reported that as result of the great demand in foreign countries the different factories are now contemplating enlargement of their plant so as to increase their output.

Button Manufacturing Co., Chinkiang.—A button manufacturing company, known as Yung Hua, has been recently established at Sing Mar Road, Chekiang. It is said that its organization and management is similar to those of Chung Hua Co.

Large Cement Works.—It is reported that a large cement plant is to be established at Lungwha, near Shanghai. Machinery will probably be ordered from America and Europe.

A Coal Brick Press.—A government coal-brick press with a capacity of 30,000 tons of bricks yearly is about to be erected at Tandjong Priok.

A Brewery.—A Japanese-Dutch concern are about to start a beer-brewery at Bandung. The company will invest four million yen in the enterprise, which is expected to turn out 48,000 bottles of beer daily.

The Chekiang Printing Press has been registered by the ministry of agriculture and commerce.

A New Paper Mill.—According to the *Shanghai-Nippo* Sino-Japanese capitalists will establish a paper mill in Kirin with a capital of $5,000,000. It is reported that the ministry of agriculture and commerce has given its approval.

The Yedo Rubber Co., Ltd., manufacturers of rubber shoes, have established themselves at 1202 Komurai, Ozuma-cho, Tokyo-fu, under the management of Mr. Takayama.

The Nitto Tape Manufacturing Co., Ltd., was organized recently, capital Y.250,000, quarter paid up. Office: 60 Taniyama, Osaki, Tokyo-fu. Manager: Mr. M. Yamanaka.

The Matsushita Paint Manufacturing Co., Ltd., 20 Takajicho, Akasaka-ku, Tokyo. Manager: Mr. K. Yamashita. Organized recently with a capital of Y.200,000, quarter paid up, to manufacture paints.

The Mitsuwa Steel Ballbearing Co., was organized recently at 217 Nakatsu-cho, Nishinari, Osaka. Manager: T. Yamakita.

The Tsutsumi Machine Manufacturing Co., was organized recently. Office: 73 Hondasanban-cho, Nishi-ku, Osaka. Manager: Mr. S. Tsutsumi.

The Seko Sho Kai Co., 1 Gochome, Shinsakai-cho, Kyobashi-ku, Tokyo, Manager: Mr. J. Kishitomi. General hardware manufacturers.

Cigarette Factory, Harbin.—A cigarette factory to be named Pei-yang, covering 500,000 sq. ft. in area, is being organized at Tung-sze-kar-tze, Harbin. It is capitalized at $5,000,000 a greater part of which is said to be invested by General Tsao Kun, military governor of Chihli and inspector general of Chihli, Shantung and Honan. It is expected to start work at the end of the current year.

Large Paper Mill, Harbin.—A large paper mill, perhaps the largest in China, is being established at Harbin by Mr. Kuo Chung-shee, former civil governor of Kirin, with several Japanese capitalists. It will cover a total area of 1,000,000 sq. ft.

A New Cotton Mill Under Organization, Wuhu.—To meet the demand for cotton products which is limited through the existence of only one cotton mill at Wuhu, Anhwei, a new mill is being organized with a capital of $1,000,000 by some local prominent merchants. A lot of land of 100 *mow* in area has been secured for the site of the mill, and machinery is being purchased.

Chinese Cotton-Spinning Co.—A Cotton Spinning and Weaving Company will be established at Kiangchow, Shansi, with a capital of $1,500,000.

Pootung Industrial Co.—Five Ningpo merchants in Shanghai have collected $10,000 to organize the Pootung Industrial Company at Kan Chiao, Pau Shan Hsien.

New Textile Co. at Shanghai.—The Feng Tien Spinning and Weaving Mill in Shanghai, a Japanese concern, is to be opened soon.

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MINING

Copper Ores at Fenghuangshan, Hsu-Hsien, Anhwei.—The copper mines at Fenghuangshan about 5 li away from Hsu-hsien, Anhwei, were opened by the natives at a time during the Ming Dynasty, and traces of the workings can be, even now, easily found in the neighborhood of the mines. Special delegates have been dispatched by the ministry of agriculture and commerce and the industrial commissioner of Anhwei to make survey of the mines for several times, and on June 12th, 1921, personal investigations were again made by Messrs. Nieh Tao-long, Kao Ping-lin, industrial commissioner of Anhwei, and Mr. Chen, one of the technologists of the ministry of agriculture and commerce to ascertain the quantity and chemical composition of the deposits to see if it is worth while opening. Borings are being made, and a joint corporation under the management of provincial merchants and officials will be organized to undertake to exploit these mines if the result turns out to be satisfactory.

Exploitation of Coal Mines at Anhwei.—A company named Lee Fong has been organized by Mr. King Wu Tsen to exploit the coal mines recently discovered at Hur Loong Hwa, about 30 li away from the city of Anking. It has been registered with the industrial commissioner of the Anhwei Province.

Another coal mine has also been discovered at Hwa Shan Hwa, at a distance of about 3 li from Hur Loong Hwa. According to the report of Mr. Shen, a mining expert, the deposits of these mines are bituminous coals and the quality is found to be better than that of the Kar Wong and Li Shan mines. A company to undertake the enterprise is being organized by Mr. Wong Hur Yue after its registration with the industrial commissioner of Anhwei.

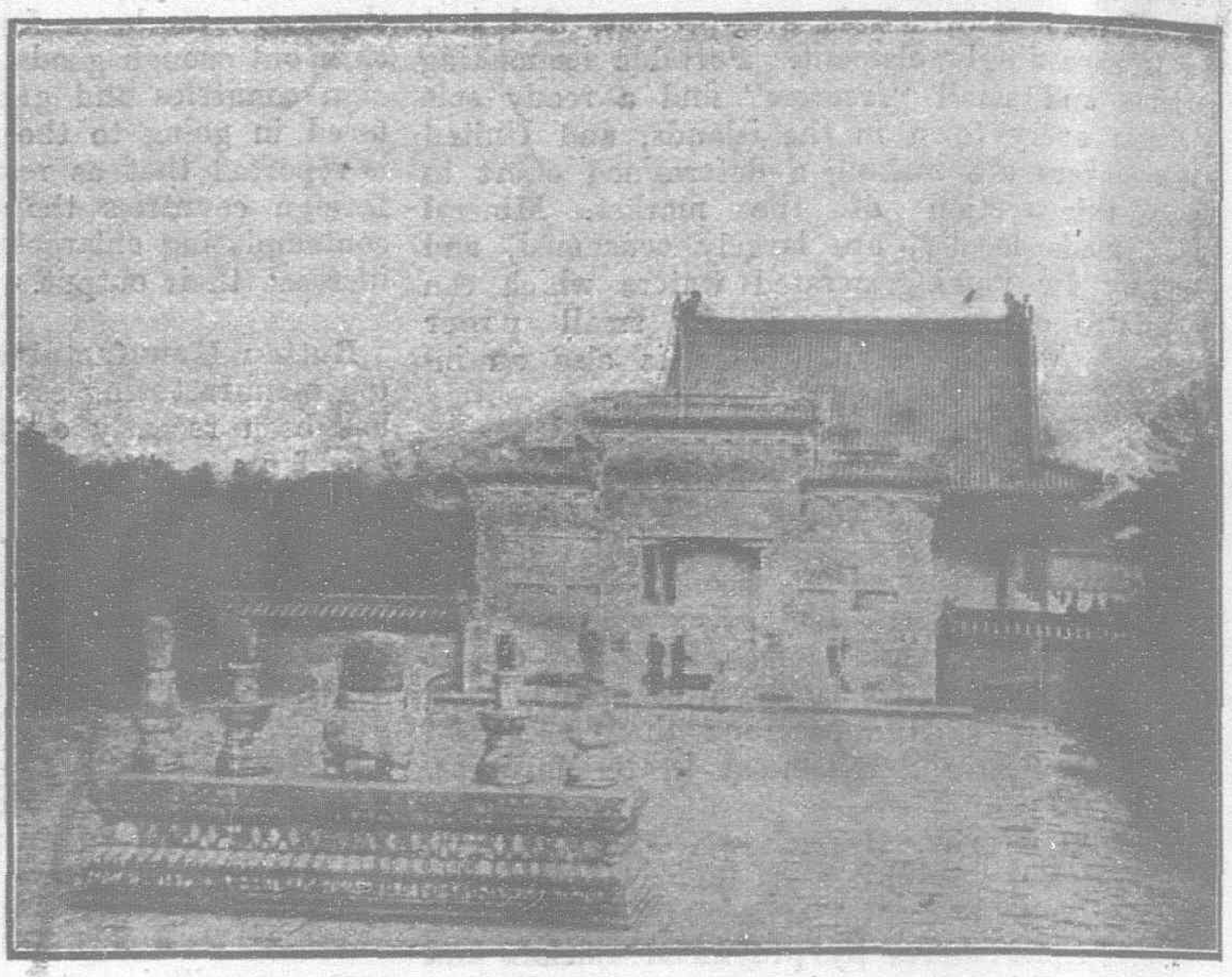
Lead Discovery, Shantung.—Valuable veins of lead have been discovered at Taianhsien, Shantung. The new mining property is near Taishan, the sacred mountain. A company has been organized and $200,000 has been raised to begin operations.

Richest Iron Ore Fields in Kiangsi.—The richest ore fields in the province of Kiangsi are found in the Yungshin district, lying south of Pingsiang, where the important collieries are situated. From every picul (133⅓-lbs.), the ore yields about 50 to 70 catties of iron (1⅓-lbs. to a catty). The smelters in the vicinity of these iron fields are said to be doing a good business by purchasing the ore direct from the takings and converting it into small handy slabs. The slabs are then transported down the river and sold to the iron foundries at Kianfu and Nanchang, the capital of Kiangsi, at $3.25 per 133⅓-lbs.

*Continued on page 576.

CHINESE GOVERNMENT RAILWAYS

SUMMER RESORT AT CHI KUNG SHAN



TOMB OF EMPEROR YU CHENG NEAR LIANG KOW CHWANG

PEKING-HANKOW LINE

"The Road Through The Heart of China"

THE Peking-Hankow Line, the most important section of China's overland route, enables tourists and travellers to get a glimpse of Old China, the train passing through magnificent scenery, traversing the great plains of Chihli, the central portion of Honan and the mountainous regions of the eastern Hupeh province.

The Peking-Hankow route joins at Fengtai the main line of the Peking-Mukden Railway, by means of which this line is connected with the railways in Manchuria, Korea, Japan, and Siberia, while steamer facilities at Hankow bring it into easy communications with the Yangtze River ports and Shanghai.

From the Capital to Hankow the journey occupies 34 hours, by the daily through train which is provided with up-to-date sleeping and dining accommodations.

In the future, this line will connect by means of a ferry-boat the Hankow-Canton Railway whose completion will bring the Capital of China, and Hankow, the Great Central Market, within easy distance of Canton the southeastern metropolie.

From the Capital to Hankow the journey about 30 hours by the bi-weekly "Express" through train which is provided with up-to-date sleeping and dining accommodations.

Chikungshan Mountain (Summer Resort).—Not many Summer Resorts in China inland, can bear comparison with the natural charming views, that reward those who ascend the mountain of Chikungshan, whose summit stands at an altitude of 1,980 ft. On reaching Sintien station, situated 110 miles from Hankow, a serpentine road climbs the mountain, on top of which are hundreds of beautiful bungalows awaiting vacationists. This popular resort is celebrated for its scenery, where an almost unbroken communion with nature can be enjoyed for a week at a time.

Hsi-ling or Western Imperial Tombs.—With their present-day accessibility, there is now little excuse for visitors to Peking omitting a trip to the Western Imperial Tombs, undoubtedly one of the most impressive sights in China. The site of these beautifully adorned Imperial Tombs is close to Liang Ko Chwang station, 79 miles from Peking, which is reached by a Branch-line, formerly built for the exclusive use of the Imperial Sovereigns when visiting the Tombs of their ancestors. The Western Tombs include the mausoleums of four Manchu Emperors and three Empresses, as well as those of a number of Princesses. The region, as a well laid-out park, closely wooded, is justly appreciated for the charming scenery surrounding the Imperial Tombs and is highly recommended to any one in search of the extraordinary and beautiful.

For Particulars, Pamphlets, Reservations, Tickets, etc., apply to the "Information Bureau" at Peking Head Office or to Tourist Agencies.

Telegraphic Address: "KINCO" **Codes: A.B.C. 5th Edition** **Telephone East 1698**

Cement Material at Chinkiang.—The earth at Changshan and Kaotze, Chinkiang, possessing peculiar features, is very suitable for manufacturing cement, earthenware made from it being able to stand rough wear. The Shanghai Cement Works at Kiangnan Arsenal has sent an expert to that locality to make a thorough investigation of the material, and experiments show that the peculiar earth can manufacture a product superior to any other brand now in the market.

Tungsten Monopoly, Kiangsi.—The government has decided to monopolise the tungsten output of Kiangsi. Merchants will do the prospecting on behalf of the government and the output will be disposed of officially. Wolfram deposits have been found in Chihli. Hunan, Kiangsi, Fukien and Kwangtung. The mineral is largely worked in the following districts of Kiangsi: Tsungyi, Tayu, Nankang, and Shangyiu.—The tungsten resources of China are more or less a matter of speculation, says the bureau of economic information.

Gold Mines Discovered, Fukien.—A gold mine covering a large area has been lately discovered at Tung-chee of Kien-er-hsien, Fukien. The deposits are found to be very fine in quality, and Mr. Liu Chung Lung has organized The Wei Ming Mining Association to undertake to exploit these mines. Two mining areas have been fixed and a survey is being made.

Shaoshing Coal Mine.—A coal deposit has been located in a hilly section of the country near Shaoshing recently. The coal is said to be of a high quality and the supply capable of withstanding eighty years of ordinary mining without exhaustion. Foreign and Chinese capitalists, including the owner of the district, have organized a company, known as the Tse Chen Mining Company, to develop the property with a capitalization of $1,000,000. The property will be opened up within a short time.

Tze-Shan Coal Mining Co.—Messrs. Shao Aulan, Chiang Yue-chien and Chao Ling-sung have established the Tze-Shan Coal Mining Co. with its Shanghai office at West Gate and it Nanking office at Ki-ziang street and with its engineering department at Lung-dai-chen. The Company will open coal mines at Shih-kar-kiang near Feng-dai village in Che-yung-hsien, Kiangsu. The coal has been found very good, containing very little impurities.

Chinese Coal Popular in South Seas.—According to those who have returned from the South Seas, a great market in that part of the globe, is offered for Chinese coal on account of the ever increasing number of factories and industrial enterprises. Those factories that are managed and financed by Chinese are desirous of using coal imported from China. More than 70,000 tons of Chinese coal are said to have been imported from China since the beginning of this year while orders for more are being placed. Telegraphic news states that the coal already received will not be sufficient to last six months and agents have already been sent to Shanghai and Canton to purchase more, principally from the provinces of Kwangtung, Shantung and Chihli.

OILS

Japanese Kerosene Oil Production.—The following gives the yield (in thousands of *koku*) of kerosene oil in Japan for the past four years, based on an investigation made by the department of agriculture and commerce:—

Kind.	1917.	1918	1919.	1920.
Crude oil	2,600	2,235	2,072	2,084
Naphtha	125	147	148	146
Lighting oil	456	398	244	185
Light oil	615	656	580	615
Lubricating oil ...	353	347	366	390
Heavy oil	549	332	198	185

Crude oil includes natural gas. The above figures show that the output of kerosene oil in Japan has decreased year by year.—*Reuter's Trade Service.*

Oil Tanks, Kowloon.—Four large oil-tanks are being constructed at the Kowloon naval depôt. It is expected that it will take several months to complete the work, which involves the laying of oil-pipes and other facilities for the conveyance of oil aboard naval vessels.

New Petroleum Island.—The Netherlands Colonial Petroleum Company have requested permission from the government to explore Obi Major, an island situated in the Batjan archipelago.

Company Amalgamation.—The Asahi Petroleum Co. has amalgamated with the Yushui Petroleum Co., capital of the new company will be Y.10,500,000.

The Standard Grease Company was organized recently with a capital of Y.1,500,000, one-half paid up to manufacture grease and substances for soap manufacture. Office: 2140 Toyoshima, Ojimachi, Tokyo-fu. Manager: Mr. Y. Nagasaki.

The Sun Petroleum Co., Ltd. is discussing the advisibility of boring at Terahaku, Ichiga province.

Japanese Oil Activities.—The Japan Petroleum Co. and the Hoden Petroleum Co., with twelve others, are now considering establishing a sales agency with a capital of Y.1,000,000 to prevent sales at cheap prices by dealers or jobbers. This plan will probably be carried out in the near future.

There are rumors of the amalgamation of the Japan Petroleum Company, capital Y.40,000,000 ($20,000,000), and the Hoden Petroleum Company, capital Y.20,000,000.

PUBLIC WORKS

Public Works in the Philippine Islands in 1920.—A total sum of $9,764,807 was spent on Philippine public works during the year 1920, compared with $8,905,645 in 1919, states the publication of the Philippine government commercial agency. This sum was spent for road construction and repair, including 198 kilometres of new roads; bridges; public buildings, including 12 markets and 47 schools; waterworks and irrigation systems, designed to benefit 300,000 hectares of agricultural land when completed in about 10 years; and extensive port improvements, providing deeper anchorages for the different ports in the islands. Artesian wells were drilled during the year at a total cost of $524,863, the 1,204 wells now in operation supplying more than 365,000 inhabitants of the islands with water.

Public Works at Changchow.—At the last meeting of the chamber of commerce of Changchow, Kiangsu, the following items regarding public works were discussed and decided upon:—

(1) That the city wall of Changchow should be repaired.

(2) That a large well should be dug to give water supply to the public.

(3) That the construction of the Tien Shee Bridge should immediately commence by asking the public for subscriptions.

RAILWAYS

New Railway Construction, Sumatra.—Surveying has been commenced in connection with the Sibolga-Batang-Toro line, and construction work will shortly be started. Reports were recently received of the surveys of territory through which will run the lines linking together the West, East and South coast of Sumatra. Under these provision is made for a line running across the island, the route lying through the Kwantan, Korintji and Indragiri districts to Tembilahan, where a new harbor is under construction, the main line sending feeders into all the surrounding agricultural districts. Railways will also serve the coal and oil centres, the south of the island, being carried through Padanag Tarap.

Peking-Mukden Rail Loan.—The loan for laying the double track on part of the Peking-Mukden line has been signed. The loan which is named partly in Peking currency and partly in British pounds, totals $2,000,000 and bears 8 per cent. interest. Interest only will be paid the first year and after that the principal will be paid in installments. The securities are the bonds of the Peking-Mukden, Shanghai-Hankow and Hu Feng Railroad lines. The first bear 5 per cent. and the last 6 per cent. interest. The government is to secure any amount not deemed to be sufficiently covered by these securities.

Suiyuan-Paotowcheng Branch Line of Peking-Suiyuan Railway.—Mr. Chow Tun-kao requests that the projected Suiyuan-Paotowcheng branch line of the Peking-Suiyuan Railway should run through Tok-hsien and Town.

New Equipment, S.N.R., has purchased 4 locomotives and 40 freight cars.

Electrical Signals, Peking-Suiyuan Line.—The electrical signals installed on the Nankow-Kongchong section of the Peking-Suiyuan line having proved satisfactory, it is proposed to instal 64 more sets on this line.

Extension of Peking-Suiyuan Railway.—The ministry of communications has ratified the contract to supply the steel rails and sleepers by Robert Dollar & Co. for the lengthening of Peking-Suiyuan Railway to Paotoutsung.

Tzeliutsing-Fuchenhsien Railway Will Resume Construction.—The railway line from Tzeliutsing to Euchenhsien, Szechuan, proposed by Mr. Liu Yen-tseng, a native of Fuchenhsien, is a very important line, though rather short in distance; for it is indispensable to the development of salt enterprise at Tzeliutsing. After approval by the ministry of communications in 1918, the construction was delayed owing to the military disturbances in the locality.

In the meantime, another railway from Tzeliutsing to Duntsingkwan has been built with Chinese and foreign money. Mr. Liu Teh-ling, the son of Mr. Liu Yen-tseng, has decided to continue the work and a preparatory office has been established at Yu-hsien, Szechuan.

Canton-Kongmoon Railway Proposed.—Some enthusiastic merchants said to have organized a company for the construction of a railway connecting Canton and Kongmoon, petitioned the local authorities for registration. In reply the local authorities instructed the newly organized company to supply the government with maps, detailed surveys, estimates, the capital of the company and other information before proper registration, can be made.

New Issue is Announced: Japan.—Yesterday the Japanese government announced a new issue of 5 per cent. exchequer notes to the extent of Y.11.479,300, which are of denominations ranging between Y.25 and Y.10.000. The new notes were, however, issued to the deposit section of the treasury, the general investment public have not been asked to subscribe.

This issue was planned by the Japanese government for the financing of the railway department and the government general of Formosa pushing forward their works. The rate of interest is 5 per cent. per annum, but the net price at which the issue is turned over to the deposit section is 93 per cent. This issue will be redeemed June 1, 1929.

At the close of this month Y.20,000,000 of treasury bills fall due. They will not be redeemed in cash, as it is stated. But they will be reissued in some form other than treasury bills.

Work of Sze-Tiao Railway. Fengtien.—According to report, the laying of rails on the Cheng-Pah section on the Sze-Tiao line of Fengtien was commenced on July 1st, 1921.

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Japanese Loans for Railways.—According to the *Chen Pao*, secret negotiations are being carried on between certain officials and the Japanese lenders for the signature of a formal agreement for the Kao-Hsu and Shun-Tsi Railways Loan. Japan is willing to give China another sum of Y.20,000,000, thus making up the loan to the amount of Y.40,000,000. China is going to give adequate security for the loan and to sign a proper agreement for the sum.

Another loan agreement has already been signed. Some time ago, on payment of an advance of $10,000,000, Japan was given the rights of construction on the Kirin-Huining Railway. The total amount of the loan is $25,000,000, and the net proceeds are 92 per cent. The commission is $1,200,000.

Yet another loan is under negotiation. Since the end of the late Ching Dynasty Japan has been anxious to obtain the franchise for the construction of the Tienpaoshan-Tumenchiang Railway, a line of 400 *li*, and an important branch for the South Manchuria Railway. Recently Mr. Ya-chun-lung-mu-lan, chairman of the South Manchuria Railway, arrived in Peking, but he has now left the capital with a permit for the construction of the line.

Tenders Invited.—Tenders are invited for the construction of quarters for four foreign tidewaiters at Newchwang for the Chinese maritime customs. Specification, form of agreement, and plans may be seen on application to the harbor master at Newchwang, on payment of Mex. $50 which will be returned on receipt of a bona fide tender.

New Engineers for Track Work.—The *N. C. D. Mail* states that it is reported that four engineers have arrived for the P. M. Railway in connection with doubling the track from Tongshan to Chinwangtao.

An Electric Line.—The government has given its sanction to the building of an electric railway between Hirano-go, Osaka, and Kashiwabara, Osaka, by the Nankai Railway Co., Ltd.

A Prospective Line.—Japanese interests have approached the government with regard to the construction of a railway line from Tienpaoshan to the Tumen River. The matter is now under the consideration of the ministry of communication.—*Reuter*.

South Manchuria Railway Company.—A semi-annual general meeting of the South Manchuria Railway Company was held at the Railway Association building recently, when it was announced that the company realized during the last business term a net profit of Y.35,540,774 inclusive of the amount brought over from the preceding term. It was decided upon on the occasion to dispose of this colossal amount as follows:

Legal reserve	Y.1,369,599
Dividend to shares held by government	5,445,902
Dividend to ordinary shareholders (6 per cent. per annum)	5,332,602
Special dividend to ordinary shareholders (4 per cent. per annum)...	3,555,068
Special reserve	5,000,000
Redemption fund	7,000,000
Bonuses and social expenses	500,000
Allowances to retiring employees ...	150,000
To be carried forward	7,187,601

To Build a Mentoukow-Kingshawu Railway.—The ministry of communications is contemplating the construction a railway from Mentoukow, a city situated at the west of Peking and linked up with the Lukouchao station of the Peking-Hankow railway, to Kingshawu. Officers have been dispatched to survey the line.

A Line to Benefit Alpine Club.—It is said that the Japan Alpine Club is petitioning the railway authorities to construct a new line between Matsumoto and Funatsu, Gifu prefecture.

The New Zealand Railway Contracts.—Glasgow locomotive manufacturers are very gratified at having carried off a New Zealand Railways contract for 45 engines notwithstanding American and continental competition.—*Reuter*.

Rebuilding of Lines.—The Tajima, Tsurumi line and the Tajima, Haneda lines in Kanagawa prefecture will be reconstructed at a cost of Y.372,000.

Light Railway in Shantung Desired.—A native of Shantung known by the name of Sun Chin-cheng petitioned to the ministry of communications for the permission of building a light railway between Tungtu and Poshan. After due consideration and thorough investigation, the proposal was rejected by the ministry, says the *Yih Shih Pao*.

Construction of Changtien-Sochen Light Railway Again Mooted.—During the year 1916, the talk of constructing a light railway between Changtien and Sochen in Shantung was taken up by the local Chinese gentry, but the scheme was dropped owing to business depression. According to reports from Tsinanfu, the matter has been received. It should be known that Sochen is a distributing centre, articles being shipped to Tsinanfu about 20 miles away from the mart, by means of junks sailing up a tributary of the Small Tsing River. On the other hand Changtien located on the Shantung railway line is fast growing to be a prosperous industrial town, stimulated by cotton plantation started by the Oriental Development Company and sugar-beet farms opened there by the Mitsubishi concern. The light railway under projection, when completed, will measure about ten miles.

Rolling Stock for Chinese Government Railways—Much publicity has been given the last few months to a loan of $6,000,000 (Mex.) made by a group of Chinese bankers to the ministry of communications of the Chinese government for the purchase of much-needed additional equipment for the Peking-Hankow, Peking-Suiyuan, Tientsin-Pukow and the Shanghai-Hangchow-Ningpo railways, says Trade Commissioner Frank Rhea.

While the invitation for tenders is issued by the Chinese banking group on behalf of the ministry of communications, it is for all practical purposes the ministry of communications that is buying this equipment direct for these several railways, which are all covered by foreign loans except the Peking-Suiyuan. It is true that the outstanding loans on the Peking-Hankow might be termed non-controlling, but the loans on the Tientsin-Pukow. Shanghai-Nanking and Shanghai-Hangchow-Ningpo are still restricting in many ways as to the ministry of communications handling these properties as it elects. The British-Chinese Corporation's action in calling attention to its claim that the present loan agreements give it (or its agents) the option for purchasing such materials for the Tientsin-Pukow, Shanghai-Nanking and Shanghai-Hangchow-Ningpo lines, and also claiming that the agreements provide that British materials be given preference is evidence of the restrictions which it is claimed these agreements carry in favor of the loaning nations.

Railway in Celebes.—As the new railway in South Celebes is soon about to be started, the Java States Railways intend to participate in the capital needed for the erection of a modern hotel at Macassar.

Short of Rolling Stock.—The Dutch East Indian government railways are still short of about 115 locomotives, 333 passenger-carriages and 3,101 trucks.

South Sumatra Railways.—The State Railways are building large workshops at Lahat, South Sumatra. The Palembang line is about to be extended from Muara to Lahat.

Electrification Railways, N.E.I.—The electrification of the railway from Meester Cornelis to Tandjong Priok will shortly be commenced.

Railways in Borneo.—A private company, who are applying for a contract to build a line from Bandjermasin to Amuntai (Borneo), have also petitioned the government to be allowed to build one from Pontianak into the interior.

To Connect Pangkiang with Pingtichuan: China.—Chang Ching-hui, commander-in-chief of the Mongolian expedition, wires asking the Peking government to build a railway connecting Pangkiang with Pingtichuan so as to facilitate transport.

Chinese Eastern Railway Loan.—Referring to the article in our previous issue on the 5th instant, a Tokyo telegram dated the 6th states as follows:

As a result of negotiations between the Chinese Eastern Railway and the Japanese banking group, it has been decided to hand Y.2,000,000 during June as the first advance, and Y.3,000,000 during July out of the total loan amount of Y.20,000,000. These advances are to be employed mostly for paying the employees, the remainder to be used for the construction of locomotives and other rolling stock and the purchase of rails and accessories. It is understood that the Japanese are to supply the necessary rolling stock and other materials.

Out of the above loan, Y.2,300,000 is to be deducted for payment to the South Manchuria Railway Company in settlement of the coal account due from the Chinese Eastern Railway.

New Director, Amur Railway.—The new provisional Primorskaya government appointed Mr. Katchenko, who was formerly director of the Amur Railway, to the directorship of the Ussuri Railway under date of the 28th ultimo. M. Kanari (late director of the Ussuri Railway) was taken into police custody early on the morning of the 27th ultimo.

The Railway Car Loan, Chinese Banking Group.—Tenders are invited by this banking group, on behalf of the ministry of communications for purchasing 16 passenger car underframes for Shanghai-Hangchow-Ningpo Railway. Regulations, drawings and specifications for tenders for the above mentioned underframes may be obtained from the office of the Chinese banking group upon payment of thirty dollars ($30). Tenders will be opened at 2 p.m. August 31st, 1921. As these drawings and specifications are fifty sets in all, each bidder is limited to one set only. The office of the Chinese banking group is located at the Peking Bankers Association, Hsih Bee Shih, Chienmen, Peking.

Deny New Rail Contract.—The ministry of communications has made a formal denial of the report of the conclusion of the Weihsien-Chefoo railway contract between the Shantung people and American financiers. It points out that the Shantung gentry have been working independently and have no intention of co-operating with foreign investors.

Kirin-Kwainei Railway Loan Consummated.—Concerning the Kirin-Kwainei Railway loan, for which a provisional agreement was signed with the Terauchi ministry and an advance of Y.10,000,000 was handed, negotiations were carried on between the Japanese and Chinese governments for the exchange of a formal agreement. The Japanese side proposed to appoint Japanese as chief engineer, traffic manager and chief accountant, which proposal was not agreeable to the Chinese side. Mr. Ono (vice-president, the Industrial Bank, Tokyo), after negotiating with the ministry of communications, Peking, arranged to seek some practical expediency about the supervision of the accounts, and the formal agreement was consummated.

Mr. Liu Meng-hsiung has been appointed president, and Mr. Wei director.

The Japanese banking syndicate has consented to advance Y.10,000,000 as construction funds.

Inspectors of Railways: Japan.—The department of railways has appointed several inspectors, whose function it is to inspect state rail ways regularly with a view to keeping up the lines' best standard of efficiency.

Tenders for Iron Wanted.—The Chinese Eastern Railway is inviting tenders for about 200 tons of various kinds of sheet and bar iron. The tenders have to be deposited at their Harbin office not later than July 15.

A New Railway for Canton to Heungshan.—Realizing the pressing need for a railway to connect Canton with Heungshan, one of the richest and most important districts in the province—its annual income from revenues and taxes is said to equal that of the whole province of Kweichow—an enterprising company proposes to construct a railway between Canton and Shik-ki, the country seat of Heungshan district. Plans and estimates for the construction of the line have been submitted to the governor together with a petition applying for registration of the company as railway concern.

It is reported that the proposed railway will have its Canton terminus at Paak Hok Tung. The lines will pass through the town of Sek Pak in Pun Yi district. As soon as an investigation of the conditions of the company by the officials have been completed and proved satisfactory, registration will be granted.—*Canton Times*.

Siberian Railways Seeking Division of Equipment.—An adequate supply of freight and passenger cars for the Chinese Eastern and Chita Railways will do more than any other one thing to stabilize conditions in the rail zones, to reports from Manchuli. The roads are now trying to agree on a division of cars. The Chinese Eastern has cars belonging to the Amur line and the Amur line has demanded their return. It has been proposed that the roads agree on a car distribution for the present and make a strenuous effort in the meantime to get more cars from some source. Surveys of conditions show that there is ample business for all the cars that can be obtained in the next few years.

Proposed of Early Construction of the Tzeliutsing-Fushun Railway in Szechuan.—The ministry of communications has approved the registration for construction of the Tzeliutsing-Fushun railway in Szechuan, 55 *li* long, filed by Mr. Liu of Fushun. The total cost for the work is estimated at about $1,400,000, of which an amount of over $1,000,000 has already been secured and it now remains to raise the balance of less than $400,000. Actual work is expected to commence in August.

RIVERS, HARBORS, WHARVES AND DOCKS

N.Y.K. Purchase "New Dock" at Shanghai—An important shipping land deal has just been concluded between the Shanghai Dock and Engineering Co., Ltd., and the Nippon Yusen Kaisha, under which the latter company has purchased the Pootung property of the Dock Co. known as the New Dock, situated almost directly opposite the New Dock and Engineering Co.'s premises in Yangtszepoo. The New Dock property covers an area of approximately 79 *mow* and has a very valuable water frontage of 1,096-ft.

Min River Conservancy.—Construction work in the first of the three sections was practically completed when the Foochow report was in the press. It was proposed to take in the third and what may prove the worst, section immediately. The second section, which has a good channel for nearly its entire length, will be left to the last. Already a decided improvement is noticeable in the approaches to Nantai. The report says that the result of the freshets will be watched with great interest during 1921. Even with the small amount of training work in position the effect has been remarkable. One small island opposite Green Island washed away about 1,000 feet, and it is hoped that this hindrance to the free course of the current will have disappeared entirely by the end of the coming season.

Dockyards.—The Kiangnan Dockyard, Shanghai, plans to construct another dockyard on the grounds in front of the naval wireless telegraph station.

New China Port Wanted.—Chinmen, a port situated on a small island opposite to Amoy in Fukien province, is excited over a report that Japan has asked the Chinese government to make Chinmen a treaty port, according to information received there.

Harbor Works, Tjilatjap, N.E.I.—Tenders are being invited for cranes, piers, godowns and other construction for the modernization and extension of the harbor works at Tjilatjap, on the south coast of Java, while railway stations and yards at Bandoeng, Batavia and Sourabaya are to be reconstructed at the cost of several million florins. As already announced, the naval dockyard at Sourabaya is also to be extended, and new docks, wharves and piers, in addition to other works, are planned. The Netherlands East Indies government intend to spend approximately fl. 5,500,000 on Sourabaya dockyard during 1921. The municipality of Bandoeng are considering the establishment of a motor omnibus service in the environs of that town, while a new railway terminus station is to be constructed and shared jointly by the Netherlands Indies Railway Co. and the Netherlands Indies State Railways.

Sourabaya Harbor, N.E.I.—A sum of eight million guilders is to be further expended on Sourabaya harbor during the present year. At first forty millions were asked for, but so much is not available.

Manila Port Improvements.—In a recent issue of the Bulletin of the Philippine government commercial agency it is stated that the port of Manila will soon be equipped with a modern marine railway or dry dock with a capacity of 8,000 tons, according to plans launched by the Honolulu Ironworks and the Earnshaw Shipways. The cost of the project has not yet been decided and the awarding of the contract is left with the representatives in Honolulu.

Dredging of Tung Dee Dong, Huchow.—The dredging work of Tung Dee Dong of Huchow, a famous silk producing place of Chekiang, is estimated to cost $600,000, one-third of which will be appropriated from the local conservancy fund and the remainder contributed by local merchants. The survey has been made and dredging will commence shortly.

Haichow Port Works.—Mr. Tuan Shu-yun, the director of the port of Haichow, is now visiting Haichow to investigate conditions there. Until the Dutch engineer who has been commissioned to carry out the survey, has completed his task, the office of the director will remain at Nanking.

Lighthouses, Hongkong.—Plans have been prepared, and work will shortly be commenced on the erection of three modern lighthouses at Tongku, Lantong Island and the channel rocks, respectively.

Woosung Port.—According to the Chinese press, the authorities of the Woosung commercial port bureau are about to make a survey of Woosung and test the depth of the water in various parts of the river.

Famine Relief Labor in Five Districts, Chihli.—Mr. Tsao Jui, civil governor of Chihli, has instructed the magistrates of the five districts concerned to carry out the following proposed construction schemes by employing famine sufferers:

(1) In Yung-chen district: to dredge the Dahching river and build a dike along the river in co-operation with Singchen district.

(2) In Chinyuen district: to dredge Chinyuenfu river, 135,000-ft. in length. The work is estimated to require 10,800 laborers for a period of five months.

(3) In Ansing district: to dredge rivers lying in Tientsin and Paotingfu and to erect embankments at important points.

(4) In Wuchan district: to plant rushes on both banks of the Fuyang river so as to strengthen the embankment.

(5) In Pingshan district: to dredge the upper reaches of the Tze-wu for 40 *li* and to establish a cotton mill to manufacture cotton goods, Pingshan being rich in cotton product with an annual production of more than 1,000,0000 catties.

Important Harbor Schemes: Japan.—The work of reclaiming 3,800-ft. and the building of a 720-foot seashore at Sakai Harbor, Osaka-fu, will cost Y.1,800,000.

The extension of the north embankment to 1,800-ft., and the reclaiming of 20,000 *tsubo* of land on which factories are to be built, at Wakanai Harbor, Hokkaido, is estimated at Y.2,600,000.

Y.930,000 will be expended on the construction of a 1,300-foot embankment and the reclamation of 3,800 *tsubo* at Nemuro Harbor, Hokkaido.

On which to build coal warehouses, 24,000 *tsubo* of land will be reclaimed along the seashore at Kushiro Harbor, Hokkaido. This will benefit the Taiheiyo Coal Company.

Important Sale of Land: Shanghai.—The Shanghai Dock and Engineering Co., Ltd., has made an arrangement with the Nippon Yusen Kaisha, Ltd., to sell to the N.Y.K. their New Dock property, to be used exclusively for wharves and godowns.

A Commercial Port Project.—A group of Chinese capitalists from the Straits Settlements is negotiating with the Canton authorities to charter and open Whampoa as a commercial port. An extensive scheme has been presented to the Canton government, embodying the construction of a harbor capable of accommodating ocean-going vessels.—*Reuter*.

Peking Authorities Dike Building in Manchurian Rivers.—With regard to the suggestion of the ministry of the interior, following a special investigation into the question of the construction of dikes on the rivers in Manchuria, that an appropriation of $400,000 should be made for that purpose, the Cabinet has decided that the ministry of finance should instruct the provincial financial department to draw the sum, and that the central government would make up any deficiency.

Dairen Harbor Works.—The S.M.R. Co. Harbor Works Office have commenced the work of extending the width of the second wharf of the Dairen wharves by 80-ft. on the eastern side. The eastern side of the same wharf has been closed to the berthing of ships since and will remain so till March, 1922, by which time the work is expected to be finished.

From the consideration of the berthing facility of the same wharf, its northern half is to be completed by the latter part of December next. When the work is done, that section will have over 30-ft. in depth capable of berthing ships of 10,000 ton class.

Next, a new goods storing ground covering 47,500 *tsubo* is to be laid out on the reclaimed land at Jijiko.

ROADS

Highway for Tungkun, Kuantung.—Since the inauguration of the Tungkun bureau of public works it has been decided to construct the Chang-mu-tau—Wei-yang road. On the 13th instant, the first sod was turned in the presence of the magistrate of the district and other prominent business men.

On the Chang-mu-tau section 600 men and women are now employed.

New Peking-Tientsin Road.—It is reported that the construction of a new road from Peking to Tientsin has commenced.

A New Road Building Company.—The Japan Roads Construction Co., Ltd. was organized recently, capital Y.1,000,000, quarter paid up, to construct roads, asphalt, concrete and macadam. Office : 8 Shichome, Honkoku-cho, Nihonbashi-ku, Tokyo. Managing Director : Mr. S. Hori.

New Roads, Japan.—Y.74,800 will be expended on a short road from Yaizu town, Shizuoka prefecture, to Aoshi village, a distance of 3,840 *ken*.

Land Purchase for Roads: Japan.—A road wiil be built between Kamifushima and Nishinari-Okashi, the land having already been purchased for the purpose.

The Chu-Yang-Fu-Ping Road, Chihli.—The superintendent of construction of the Famine Relief, Tingchou Branch, Mr. Thacher Souder reports that the 60 *li* road through mountainous country known as the Chu-yang—Fu-ping Road will soon be completed, cost being in the neighborhood of $12,200. The road has two feet and a half of solid stone for a foundation and precaution against destruction by mountain torrents has been made. The road will be used both for mule and cart transport and it is hoped that it will be the means of winning back the cloth trade which has been diverted into Shensi by a road to the North. Thousands of pilgrims who travel over the road every year will greatly benefit by this good road.

Road Development in the Philippine Islands—The 30 provincial road projects, which are part of the program of the insular government for 1921, will double the length of first-class roads in the islands, bringing the total to more than 8,000 kilometers, distributed in provincial and interprovincial systems throughout many provinces. Many provincial auto and truck lines have long been in operation and new lines are being added. Some of the companies are well capitalized and operate in various parts of the islands through a general corporation, with reasonable freight and passenger charges, says the *Trans-Pacific*.

New Road, Canton.—A motor road to the famous Loh Fo Hills is projected by a supervisor of the maritimes customs administration at Canton. His suggestion is that it should start from Wang Ka Shan, immediately opposite the city of Sheklung. The local authorities are said to favor the project. It is estimated that the road will cost $150,000 to construct.

Roads for Military Service Designed, Kiangsu.—The Kiangsu provincial authorities have designed the following roads to be built for military service, in accordance with one of the provisions of the regulations governing the designing and construction of provincial roads promulgated by the president of the country some time ago :—

(1) From Nanking to Woosung via Chinkiang, Chieh-pih, Peichen, Mun-ho, Peh-chang, Sun-kiang and Kiang-yin, a distance of about 770 *li*.

(2) From Wusih to Chenkiang iva Ching-yang-tseng covering a distance of 90 *li*. This line is intended to take place of the Grand Canal when it is frozen up in winter and is not navigable.

(3) From Quo-chow to Tsing-kiang via Yanchow, Kao-yu and Pao-ying, a distance of 370 *li*.

(4) From Tsing-kiang to Hai-chow, a distance of 80 *li*.

(5) From Tsing-kiang to Hsuchow via So-chien, a distance of 180 *li*.

(6) From Pu-tseng to Hsuchow, along the Tientsin-Pukow railway (distance unknown).

Highway Construction, China.—A Chinese company, with a capital of $250,000 Mexican, has been formed for the purpose of constructing a highway from Shanghai to Linho, a distance of 20 miles, reports Trade Commissioner Meekins. This road will be surfaced with stone and will have a width of 12-ft. The work will be under the direction of the local authorities and the cost, estimated at $150,000, will be refunded to the company from the proceeds of a surtax on land contiguous to the new highway. There will be spent for motor busses $100,000. Over four routes in Northern Kiangsu and Southern Shantung, representing a total distance of 170 miles of roads, 16 American motor busses are now being operated. An additional line is planned for a new route over roads 70 miles long. Seven American motor busses are in use at Nantungchow, Kiangsu. A road is under construction at Wusih, 7 miles in length, of which less than 3 have been completed. An organization formed in Shanghai under the name of the good roads movement is advocating the construction of 260 miles of highways connecting Shanghai, Wusih, Changchow, Nanking, Hangchow and intermediary towns, the route in general forming a circuit around Taihu Lake. This route has not yet been surveyed.

Obstacles to Philanthropy.—The American Red Cross proposed to build six branches to the Tung Ling automobile road of Shantung, as follows :

(1) From Liaochen to Da-ming-fu via Quadao.

(2) From Liaochen to Lingchin.

(3) From Liaochen to Zerchang via Yangkao.

(4) From Liaochen to Wuchenching.

(5) From Liaochen to Shawhauching or Wudechsien via Yuchen and Weiming.

(6) From Weiming to Chinwooching of Chihli.

The people of eighteen districts, however, strongly oppose the project, as the roads will destroy the crops and inflict serious harm to the famine sufferers. Telegrams have been despatched to the civil and military governors by the gentry requesting cancellation of the scheme. A meeting of protest was held by the famine relief association during the later part of May, in which the following resolutions were passed :—

(1) To ask the American Red Cross to postpone the commencement of work for one month.

(2) To ask them to make good for the loss of crops destroyed by the construction of roads in case of their refusal of postponement.

(3) The proposed roads to be adjusted by making a short cut so as to reduce length and minimize the loss of crops.

Tung-Wu Automobile Road Completed.—The Tung-wu automobile road lying in the districts of Wuting and Tungchang, Shantung, constructed by the American Red Cross, has been completed, and inauguration ceremony was formally held at Yucheng on June 10, 1921.

Another New Automobile Road in Shantung.—The Famine Relief Society of Shantung is planning to build a main line of automobile road from Liaochen to Chen-tze-kow via Chenping, Kaotang, Yuchen, Ling-I, Songwu and Weiming, covering a distance of 520 *li*, and a branch line from Weiming to Chin-wu-ching of Chihli, a distance of 60 *li*, making a total length of 580 *li*. The work is estimated to require 899,500 sq. ft. of earth, with 2,000 laborers for a period of six months, at a total cost of $1,650,000. Measures are being taken to raise the prescribed amount.

To Build a Modern Road, Changchow.—As the route from Pun-new to Hsiaowu-tseng of Changchow, Kiangsu, is an important highway, the local citizens have proposed to build an automobile road between these two points and thereby to organize a limited stock company to undertake the enterprise. The capital required is being raised.

A Shanghai-Chowpu Road.—A modern road will be built between Shanghai and Chowpu, Pootung, as proposed by Messrs. Chu Ziang-peh and Mo Hsian-yao (leading local gentry) to the city magistrate.

Canton's New Roads.—With the proceeds realized from the sale of public property and a sum of $010.000 from the provincial bureau of finance, the Canton municipality will undertake to finish the first stage of road construction in the city and tenders are invited to contract for the construction of the proposed four roads which have not been completed, viz., for the construction of the Pan Fook Maloo. The Great South Maloo, and the Yet Sou Central for which bids will be accepted on June 22nd, and bids for the construction of the Mun Ming Maloo will be accepted on the 18th instant.

SHIPPING AND SHIPBUILDING

New Steamers, Nanchang.—The Chengchow Steamship Navigation Co., Nanchang, has ordered 2 launches named the *Soochow* and *Hangchow*, respectively, each having a tonnage of 19 tons, drawing 2 feet deep water, with a measurement of 55 feet long and 10½ feet broad speed of 30 *li* per hour, to ply between Nanchang and Kungchow via Fenchen, Chongshu, and Kian.

The Kiangnan Dock has decided to build another dock and has acquired land in front of the naval wireless station suitable for this purpose. The work is expected to start during the month of June.

New Steamer for Yung-Woo Steamer Navigation Co.—A new 30-ton steamer named *Chintai* having 30 H.P. drawing 5 ft. deep water, with a measurement of 75 ft. long and 14½ ft. wide, speed 30 *li* an hour, has been completed for the Yung-Woo Chinese Steamship Navigation Co. of Shanghai. It will run from Chinkiang to Tsinkiang via Quarchow, Yangchow, Kaoyue, Paoying, Weichen and Weikwan, and registration has been made with the custom house and the ministry of communications.

New Steamer for Tien-Tai Steamship Navigation Co.—The Tien Tai Chinese Steamship Navigation Co., Shanghai, has lately had a new steamer built named *Tung-Chin*. The dimensions are: Length 68 ft. ; breadth 12 ft. 5 in. ; draft 4 ft.; tonnage 24 tons ; speed 30 *li* per hour. It will run between Chinkiang and Tsinkiang, Kiangsu and is expected to be launched shortly.

New Steamer for Hung-An Steamship Navigation Co.—The Hung-An Chinese Steamship Navigation Co., Shanghai, has built a 994-ton steamship by the name of *Wuling*, having 500 H.P., drawing 6 ft. 10 in. deep water with a measurement of 223 ft. long, 40 ft. wide, speed 7 knots per hour, to run from Shanghai to Changsha via Chinkiang, Nanking, Wuhu, Kiukiang, Hankow, Shatze, Ichang, and Yochow. It will be launched as soon as the registration with the ministry of communications has been sanctioned.

Tanksteamer Order with America.—The Japanese naval authorities have recently been negotiating with the New York Steamship Company for the building of a tanksteamer of 20,000 tons and a contract has just been concluded. The ship is said to cost about six million yen. It is the first time for the naval authorities to place an order for a ship with America.

New Japanese Oil Steamer Built in America.—An oil carrier of 20,000 tons and supplied with the new screw attachment will be built in the United States for Japan at a cost of Y.5,000,000.

Steam Launch Navigation Co., Wuhu.—The Chine Chee Steam Launch Navigation Company was established at Wuhu by Messrs. Shun Tso Zo and Wei Ya Chen to run a regular service along the Wuhu-Lu Kiang line.

Ningpo-Shaoshing Steamship Navigation Co., Shanghai, is reported to have earned a net profit of about $200,000 during the year of 1920.

Sino-Belgian Steamship Navigation Co.—Belgium has proposed to the Chinese government to organize a Sino-Belgian Mail Steamship Navigation Co., with a view to developing the trade between China and Belgium. The proposal has been carefully considered by the Chinese government, and two navigation lines have been decided upon :—

(1) From Shanghai to Anvers via Hongkong, Singapore, Bombay and Aden.

(2) From Shanghai to Anvers via Yokohama, passing through Panama Canal, touching New York and Liverpool.

Lee Wai Steamship Navigation Co., Anhwei.—Two steam launches of 12 *h.p.* each have been added to the fleet of the Chinese Lee Wai Steamship Navigation Co., Anhwei : one named *Yu-foo* having a tonnage of 8, drawing 3 ft. 5 in. deep water, with a measurement of 48 ft. long and 11 ft. wide, speed 30 Chinese *li* per hour; the other named *Hung-foo* having a tonnage of 6, drawing 3 ft. 5 in. deep water, with a measurement of 46 feet long and 8 feet wide, speed of 30 *li* per hour. These two vessels are to run from Peng-pu to Jen-yang-kwan via Fai-yuen, Feng-dai, and Zerhsien.

C.M.S.N. Navigates the Changsha-Hankow Line.—A branch office of the China Merchants' Steamship Navigation Co., Shanghai, has been established at Changsha, Hunan, to operate on the Changsha-Hankow run. Service began on April 5, 1921, with three vessels.

Proposed New Shipping Company.—Enthused with the success of the China Mail Steamship Company, which is a purely Chinese concern, and with the object of competing for a portion of the foreign shipping business, a party of Cantonese, it is reported, will soon organize a steamship company with a capital of $4,000,000 to put a number of ships on the service, between Hongkong, Honolulu and San Francisco and to sail to New York, Cuba and Panama. The name of the proposed company is to be the Chung Hwa Steamship Company.

New Far Eastern Lines.—The new 20,000-ton Canadian Pacific liner, *Empress of Canada*, has finished successful speed tests on the Clyde, but her cabins will probably have to be fitted abroad. It is proposed to send out the vessel via the Panama Canal. She will run between Vancouver and Japan, and will be the largest and fastest liner on the Pacific.—*Reuter*.

Osaka Shosen Kaisha: Ten Ships Building.—The Osaka Shosen Kaisha has under construction ten ships at home and abroad with an aggregate gross tonnage of 33,200. Seven steamers are now being built at the Osaka Iron Works and of the above the *Seikyo Maru*, 2,600 tons, will be delivered to the orders next June and the *Nagato Maru*, 2,600 tons, next July. The remaining five ships will be completed by next February. The Company's *Baikal Maru*, 5,000 tons, under construction at the Mitsubishi Shipbuilding Yard, Nagasaki, will be launched August and afterwards will be allotted to the Dairen passenger service to relieve the *Kagi Maru*. *The London Maru*, 7,500 tons, and the *Paris Maru*, also 7,500 tons, are now being built in England, the former to be launched next August and the latter December.

New Service to Korea and China.—A new shipping service is expected to be inaugurated between Gunsan and Tsingtao as a means of furthering the trade between Korea and China. At present almost the only port in Korea providing facilities for trade with China is Chemulpo, and Japanese business men in Korea now feel the necessity of opening an extra shipping service. With this end in view negotiations have been in progress for some time past between the Gunsan chamber of commerce and the Korea mail steamship company. The proposal is now assuming practical shape, and it is expected that the Gunsan-Tsingtao service will be shortly opened. This service is to be subsequently extended to Dairen and Yingkow.

Y.K.K. Starts Line from Kobe to Siam.—Yamashita Kisen Kaisha has been noticeably active in opening new shipping lines. It has recently increased regular sailings on the Yokohama-Korea run to five a month, vessels used for this purpose being the *Uwajima Maru XI*, the *Shinyei Maru*, the *Kishiwada Maru* and several other extra steamers. Another new service between Yokohama and Kobe is designed to compete with railway transport charges, which were raised some time ago.

In addition to the Formosa-South China service, which is subsidized by the government of Formosa, the company has opened a through service between Kobe, Saigon and Bangkok. This is the first Japanese service to be opened in that part of the world. On the outward voyage vessels will carry general cargo for the most part, while the principal cargo for the return voyage will be rice.

In the seas further afield, the Yamashita Kisen Kaisha has placed the *Yoshida Maru*, 8,769 tons, between North America, Australia and Japan. Besides, the company contemplates inaugurating a service from North America to South America.

The several small ships which were recently chartered by the company are expected to be used on its new coasting and near-sea lines.

New P. & O. Boat.—The British India Steam Navigation Company's steamer *Manela* started on her maiden voyage as a Peninsular and Oriental Line steamer recently, sailed from London with passengers and cargo to the Straits Settlements, China and Japan.

The *Manela* belongs to the group of twelve 8,000-ton ships of a similar type, built for the Bombay-London trade.—*Reuter*.

Sino-Belgian Steamship Company.—It is reported that for the purpose of getting funds for the formation of the proposed Sino-Belgian Steamship Company, the government is contemplating the sale of the German and Austrian steamers to certain Belgian interests. The proceeds of the sale will be partially used for meeting the financial requirements of the central government and partially be subscribed as Chinese share to the proposed Sino-Belgian Steamship Company for the promotion of Sino-Belgian commerce and industry.

A New Steam Ferry Launch Co., Pootung.—The Pootung Steam Ferry Launch Co., Ltd. is being established by Mr. Doong Sze-heng, a Shanghai merchant, with a capital of $100,000. It will run a regular ferry service in the Whangpoo River with six steam launches and eight towboats. Application for the approval and registration of the proposed company has been made with the local authorities.

A Sino-Franco Steamship Co. Established Shanghai.—A Sino-Franco steamship company has been established by Chinese and French leading merchants at Shanghai with a capital of Tls. 300,000. The first ship sailing under the flag of this new company is the s.s. *Kiang Chin* having a capacity of 500 tons and will sail between Chungking and Ichang.

Vessels Built at Shanghai for Chinese Owners.—The steam-launches *Chunhsin* (89.67 tons register), for Chun Hsin Steam-launch Company; *Chuheng* (53.48 tons, for Ta Ta & Co.; *Chianghua* (4.57 tons), for Hsieh Chi & Co.; *Chenhuai* (47.78 tons); for Li Chi & Co.; *Fengho* (13.89 tons), for Feng Tai & Co.; *Hengtahsing* (4.01 tons), for Heng Ta Cotton Mill; *Hsinlichiang* (5.57 tons), for Chen Chi & Co.; *Hsinsookun* (5.50 tons), for Lan Chien Kung Chi; *Hsinshengho* (37.72 tons), for Hsu Ching Yung; *Tungsen* (15.02 tons), for Sheng Tai Hsing; *Yuanhsiang* (12.44 tons), for Yuan Tung & Co.; *Yuanchi* (19.68 tons), for Yuan Tung & Co.; the motor-launches *Hsinyuan* (4.20 tons), for Yi Hsin Ironworks; *Ningping* (5.06 tons), for Ning-Shao Inland Steam-launch Company; *Ningan* (5.06 tons), for Ning-Shao Inland Steam-launch Company; *Wukong* (4.73 tons), for Shanghai-Hangchow-Ningpo Railway Company.

Tientsin People Organize Steamship Co.—It is stated that Tientsin residents interested have organized a steamship company for the purpose of opening a steamer service between the local port, Lungkow, Dairen, Chefoo and Chinwangtao.

Japan Building Only Few Merchant Ships.—The construction of merchantmen in this country shows a great falling off. According to the investigations of the department of communications, only two vessels of not less than 1,000 tons gross were launched during June. They are the *Changsha Maru*, 2,600 tons gross, built by the Osaka Ironworks for the Osaka Shosen Kaisha, and the *Wales Maru*, 6,500 tons gross, of the Kawasaki Dockyard. While only these two ships, totalling 9,100 tons gross were launched during last month, 10 ships, totalling 42,470 tons gross, were launched in the corresponding month of last year.

Between January and June last, vessels launched of not less than 1,000 tons gross each number 27, totalling 144,250 tons gross, as against 60 ships, totalling 283,855 tons gross in the same period of 1920. It will be seen that the output of commercial tonnage has decreased by nearly half since last year. Prospects for the remainder of the year are even worse. It is expected that only one ship will be launched during July, while there will be no ship launched in August and September, excepting ships of less than 1,000 tons gross.

New Japanese Shipping Combine Proposed.—A new Japanese shipping combine has been proposed. When an amalgamation of all the shipping companies was proposed some time ago most of the smaller companies favored the idea, but the larger companies, while agreeing in principle, were not willing to merge their interests with weaker concerns. Under the proposed arrangement the various subsidized companies would give up their ships and titles to the holding company, while the other assets would be divided among those who now hold shares. Certain other companies would merely offer their vessels. The promoters are hoping to control about two and a half million tons dead weight of shipping and to capitalize the merger at about half a billion yen. As shares of the different shipping companies have a very wide range in value the shares in the new company would have to be apportioned according to the holdings in the separate concerns. The value of the shares in the new company which the present shareholders of the Nippon Yusen Kaisha would receive would be based on an estimate of Y.75,126,000, as covering the value of ships now held, ships not yet completed, business premises, and the right to operate the Nippon Yusen Kaisha lines. The value of other assets which the Nippon Yusen Kaisha would not turn over to the amalgamated company would come to about Y.150,000,000, which amount would be distributed among the present shareholders according to the amount of stock which they hold.

A New Shipping Co.—Mr. Fu Siao-en and several other Chinese and French gentlemen were elected directors of the newly formed Sino-French Steamship Co., at a meeting held recently at No. 6 The Bund. The capital of the new company is $300,000. A steamer has already been purchased and will run between Ichang and Chungking. Mr. Tang Yu-kan has been appointed compradore.

TELEPHONES AND TELEGRAPHS

Communication Between Tokyo and Mogi.—A telephone line will be laid from Tokyo to Mogi.

America Plans to Lay Shortest Cable to Far East.—Investigations are proceeding for the purpose of laying the shortest cable between America and the Far East. The cable will start from Seattle, and by way of Alaska and Alentian Islands, reach Kamchatka and Kurile Island, whence to proceed to Vladivostok. The proposed line will reduce the present route by over 2,000 miles.

Chongchow-Shihkachuang Telegraph Line.—The ministry of communications will build a telegraph line along the new Chongchow-Shihkachuang automobile road.

New Telephone Office, Sha-Tze, Hupeh.—The building of the sub-telephone office at Sha-tze, Hupeh was formally opened on May 15, 1921, with many new subscribers.

TRAMWAYS

A Prospective Tramline.—The ministry of communications has been asked to sanction a tramway service to be constructed from North Szechuen Road extension to Chengju, Nanzing and Woosung. Messrs. C. C. Nieh, Wu Ting-sung, and Sun Lien-fang are said to be principals in the concern, which is to have a capital of $1,500,000.

Shanghai-Paoshan Tramway.—As previously reported, the plan for the building of the Shanghai-

Paoshan tramway is maturing. It has since been learned that the corporation to undertake this enterprise will be capitalized at $1,500,000 and permission to hold the right of monopoly for a period of 50 years is requested by the promoters, Mr. Wu Tin-sun and Mr. C. C. Nieh, leading merchants of Shanghai.

A High-Speed Tramway for Holiday Makers.—The new high-speed tramway was opened at the beginning of July, connecting Osiage, Honjo Ward, and Tsudanuma, Chiba prefecture. In the neighborhood of Tsudanuma, a recreation ground, covering about 300,000 *tsubo*, will shortly be laid out for the benefit of Tokyo and Chiba holiday makers. The new tramway line will run the distance in less than 25 minutes.

New Line Between Tokyo and Nikko.—Work is progressing with the construction of this line, land having been purchased. Eleven stations will be built in Saitama prefecture.

Tramways, Hunan.—The construction of an electric tramways system from Siangtan to Changsha, China, a distance of about thirty miles, is being considered. The scheme includes the acquisition of fifteen tram-cars.

Tramways to be Built in Chapei.—After consultation with the gentry and prominent merchants concerned, the Shanghai Chinese Tramway Co. has decided to build tramways in Chapei, and two lines have been fixed :

(1) From Sinza bridge along the Soochow Creek to Tso-da-kow passing through San-pei-chen bridge, about 6 *li* in distance.

(2) From Shanghai-Nanking railway station eastward to Kiangwan, about 7 *li* in distance.

It is understood that surveys on the abovementioned lines are being made.

New Japanese Electric Lines.—A company bas been formed for the construction and operation of a new electric line from Tokyo to Yokohama, running approximately 1½ miles inland from the present railroad. The Musashi Electric Tramway Co., as the newly organized firm is called, will also furnish electricity to the villages *en route*, states the *Japan Advertiser*.

A translation from Nagoya Shimbun reports that plans are being made for the construction of a railroad 61 miles long between Nagoya and Yamada for the accommodation of visitors to the Great Shrines of Ise. Power is to be supplied by the Ibugawa Electric Power Co. Another line, 30 miles long, around the Chita Peninsula, is planned by a company to be capitalized at Y.4,000,000 to Y.5,000,000. Another translation, from the *Osaka Mainichi Shimbun*, reports a project for the construction of an electric railway between Nagoya and Gifu, as the traffic between these two places is very heavy. It is proposed to construct a double-track line paralleling the present steam railway at an estimated cost of Y.7,000,000. A line between Gifu and Ogaki is also planned.

Chinese Tramway Co., Shanghai.—The total revenue of this company, during 1920 showed an increase of $14,000 over that of 1919, the number of passengers increasing by more than 1,296,000.

The company will double track the important sections of its lines, viz., from Son Wen Men to West Gate and from Sih Kar Pang to Kiangnan Arsenal.

Double Tracks on Shanghai Chinese Tramways.—Work on doubling the tramway tracks on the lines from Lao-so-men to San-wen-men and from the East Gate to the South Gate of the Chinese city, Shanghai been commenced by the Shanghai Chinese Tramway Co. for the improvement of the tramway facilities of the Chinese city. The work is expected to be completed before September 16th, 1921, the Chinese midautumn festival.

WATERWORKS

Waterworks, Chapei.—It is proposed by Mr. Wong Chien-shan, chief of the technical department of the Chinese electric light and water supply plant, Chapei, that 16-in. diameter water pipes be installed from Yung Shun Road to Kung Shun Road. The work will commence immediately after the proposal receives approval from the Kiangsu provincial assembly. Upon the request of the fire department, more hydrants will be installed in the Chapei district.

WIRELESS

Wireless Telephones in North Fukien.—The governor of Fukien province is very anxious to establish wireless telephone connection between the leading cities of the province, writes Consul Hanson, from Foochow. The governor has been so interested in the matter that he recently offered to defray the expense of a demonstration at Foochow. Firms interested in the sale of wireless telephone outfits can either address the governor direct, in English, or can send communications to the consulate at Foochow to be transmitted to him.

Japanese at Tsingtao Building Two New Wireless Towers.—The Japanese authorities at Tsingtao have completed the construction of two wireless towers and are now awaiting the arrival of the necessary electrical equipment from Japan before opening the new wireless plant. The two towers have been constructed from material captured from the Germans in 1914, and the plant will, when fully equipped, be powerful enough to communicate with any wireless station in Japan.

Tsingtao Japanese maintain that the new plant will be operated for strictly commercial purposes, but the secrecy that is being maintained about it and the fact that no one is allowed to go within a hundred yards of the towers inclines the foreign residents of Tsingtao to the belief that the new wireless station is designed to replace the naval wireless station that was dismantled a few weeks ago. This latter station was, it is generally stated in Tsingtao, given up by the Japanese because it could not be made to function properly.

Improvements in Philippines Wireless Telegraphy.—Recent improvements in the naval wireless telegraph station at Cavite now enable the transmission of radio messages from the Philippines to San Francisco without relay. A large increase in electrical power and the construction of telegraph lines between Cavite and Los Banos are responsible for this direct Pacific wireless service covering some 7,000 miles. Formerly despatches from the islands to points in the United States were copied at Honolulu and relayed to the mainland. This meant unnecessary delay in transmission. The improvements will treble the capacity of the naval radio service to and from the Philippines. The naval radio stations at Cavite and Los Banos are handling a daily total of approximately 12,000 words. The service covers all of the Navy and Army business, some of the insular government's messages, the Associated Press despatches amounting to 1,000 words a day, aside from other press matter, and a considerable volume of commercial business, according to a statement in the bulletin of the Philippine government commercial agency in New York.—*Commerce Reports.*

ELECTRICITY *

New Electric Power House, Fushun.—The new electric power house on an up-to-date pattern, which is to be the third power house at Fushun collieries will be completed during August and will be opened to operation by October next.

This power house is to use dust coal for fuel.

The chimney of the new power house will be taller than the tallest at Dairen, being 260-ft. high, measuring some thirty feet in diameter on the top.

New Electric Companies.—Huang Kya-lin and others have organized the Yau Tai Electric Light Company at Tai Hsin, in Kiangsu province.

The ministry of communications has granted the Sing Yang Electric Light Company of Sing Yang, Honan, its registration.

The Ojoko Dengyo Co. was organized recently *to manufacture electrical apparatus.* Office : 4 Itchome, Yuraku-cho, Kajiwachi-ku, Tokyo. Manager : Mr. R. Taya.

The Tasoda Electric Bulb Manufacturing Co., 92 Minami Shinagawa-cho, Tokyo-fu. Manager : Mr. G. Terada. Established recently.

INDUSTRIAL †

New Paper Mill.—According to the *Shanghai Nippo* (Japanese), Sino-Japanese capitalists will establish a paper mill in Kirin with a capital of $5,000,000. It is reported that the ministry of agriculture and commerce has given its approval.

The Katsura Iron Works was organized recently to manufacture general machinery adn machine tools. Office at 193 Minami Uagai, Toyosaki-cho, Nishimari, Osaka. Manager : Mr. T. Imanaka.

Paper Mill Amalgamation.—The Oji paper mill will amalgamate with the Karafuto Production Company and the Chosen Paper Mill Company in Korea. The capital of the new company is Y.51,000,000.

Manufacturers of Machinery.—The Tsitsumi Machine Manufacturing Co. was organized recently to manufacture machinery. Office : 73 Hondasanban-cho, Nishi-ku, Osaka. Manager : Mr. S. Tsutsumi.

The Asia Tobacco Co., Ltd., whose head office *is in Tsingtau, will build a factory* at Mukden under the direction of Mr. Inumaru at a cost of Y.10,000,000.

To Manufacture Wrapping Paper.—The Tokyo Wrapping Paper Company, Ltd. was organized recently with a capital of Y.55,000. Office : 765 Yanaka, Nippori, Tokyo-fu. Manager : Mr. S. Yanagi.

The Kaweda Soap Manufacturing Co. was organized recently to manufacture soap. Office : 939 Nippori Mashi, Tokyo-fu. Manager : Mr. S. Kaneda.

Machinery Exhibition at Osaka City.—An engineering and machinery exhibition will take place in Osaka in October for the purpose in promoting interest in general motors, machines and tools.

Paper Mill in China.—The Okura gumi proposes to commence business with a capital of Y.5,000,000 by building a paper mill at Kitsurin, China. Necessary official permission has been obtained.

The Ishibashi Iron Works has been established to manufacture printing machines. Office at 4464 Itchome, Nihonbashi-suji, Minamoku, Osaka. Manager : Mr. K. Kawaguchi.

The Colonial Industry Company was organized recently at 1828 Kameyedo, Tokyo-fu, to engage in general construction contracting. Manager : Mr. S. Suzuki, Branch office at Karafuto.

The Settsu Iron Works was organized recently to manufacture general machinery. Office : 85 Ichioka-machi, Nishi-ku, Osaka. Manager : Mr. M. Tomari.

The Taichi Industrial Co., Ltd. was organized recently with a capital of Y.250,000, fully paid up, to do a business in road construction materials. Office : 26 Sanchome Minami Yedobori, Nishiku, Osaka. Managing Director : Mr. D. Osawa

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* † Continued from page 569.